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PART III.

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EXPLORATIONS AND SURVEYS FOR A RAILROAD ROUTE FROM THE MISSISSIPPI RIVER TO THE PACIFIC OCEAN.
WAR DEPARTMENT.

ROUTES IN CALIFORNIA AND OREGON EXPLORED BY LIEUT. R. S WILLIAMSON, CORPS OF TOPOGRAPHICAL ENGINEERS, AND LIEUT. HENRY L. ABBOT, CORPS OF TOPOGRAPHICAL ENGINEERS, IN 1855.

BOTANICAL REPORT.

WASHINGTON, D. C.
1857.

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BY J. S. NEWBERRY, M. D.,
GEOLOGIST AND BOTANIST OF THE EXPEDITION.

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No. 1.

REPORT UPON THE BOTANY OF THE ROUTE.

BY JOHN S. NEWBERRY, M.D.,

BOTANIST OF THE EXPEDITION.

CHAPTER I.

GEOGRAPHICAL BOTANY.

INFLUENCES AFFECTING THE BOTANICAL CHARACTER OF THE REGION BETWEEN SAN FRANCISCO AND THE COLUMBIA.—LAWS CONTROLLING THE DISTRIBUTION OF SPECIES AT PRESENT NOT UNDERSTOOD.—NOVELTY OF BOTANICAL CHARACTER OF THIS REGION.—VARIETY OF ANNUAL PLANTS.—SMALL NUMBER OF TREES.—PREPONDERANCE OF CONIFERÆ.—CLIMATE.—GEOLOGICAL STRUCTURE.—LOCAL BOTANY.—COAST MOUNTAINS.—CLIMATE.—CAUSES AFFECTING IT.—VEGETATION.—FORESTS.—SHRUBS.—FERNS AND MOSSES.—SACRAMENTO VALLEY.—CLIMATE, CHARACTER OF SEASONS.—VEGETATION.—ITS ANNUAL CHARACTER.—TIMBER BELTS.—LOCAL BOTANY.—WILD OAT.—OAK GROVES.—SHRUBS.—TULE.—CHARACTER OF SOIL.—TIMBER BELTS AND THICKETS ALONG THE RIVER BANKS.—BOTANY OF SIERRA NEVADA.—ITS UNITY OF CHARACTER.—FORESTS.—LOCAL BOTANY.—ZONES OF VEGETATION.—ANNUAL PLANTS.—BOTANY OF THE DISTRICT EAST OF SIERRA NEVADA AND THE CASCADES.—UNIFORMITY OF VEGETATION.—SAGE PLAINS.—YELLOW PINE FORESTS.—LOCAL BOTANY.—BUNCH GRASS.—ANNUAL PLANTS.—BOTANY OF KLAMATH LAKE.—BOTANY OF THE DES CHUTES BASIN.—BOTANY OF THE CASCADE MOUNTAINS.—BELTS OF VEGETATION.—FORESTS OF WILLAMETTE VALLEY.

THE influences which have given character to the flora of the region lying between San Francisco and the Columbia, both as regards its botanical relations and the distribution of the plants which compose it, as in other countries, have been connected with its geological structure, its topographical features, and its climate.

To these causes, which are very appreciable in their action, and which have produced by far the most striking phenomena presented by the vegetation of the west, another should be added, that which has controlled the radiation of species from their original centers of creation.

The operation of this latter cause, though perhaps not less real, is far more obscure, requiring for its analysis an array of facts much greater than has yet been collected. This has, therefore, been entirely neglected, except in the few instances where plants are common to both sides of the continent, and an effort has been made to connect their eastern and western habitats. When the botany of the west shall come to be known far better than at present, we may expect that the physiological laws which have controlled the distribution of plants may be studied with equal profit with the more material influences of which I have spoken.

At present any hypotheses in reference to them, however plausible they may appear, must necessarily involve so much uncertainty, that they should be regarded as speculations rather than generalizations of fact. And in the future, by whomsoever theories on this subject may be suggested, and whatever weight or personal influence may be thrown into the scale, that

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personal influence must be carefully eliminated, and the facts permitted to stand isolated and independent, until, without compulsion, they shall crystallize into truths.

The botanist going from the valley of the Mississippi to the Pacific coast, will be immediately struck by certain general differences which he will perceive to exist between the vegetation of the region he has left and that to which he has come. The first feature in the aspect of the botany of the west, which he will be likely to notice, is the paucity of arborescent and the variety of annual plants.

The forests he finds restricted, for the most part, to the sea coast and the mountain sides, and exhibiting a great preponderance of coniferous over dicotyledonous trees. The forms of vegetation by which he is surrounded in these forests are among the most magnificent which the world affords, and nearly all are new to him. He may traverse the country for weeks, perhaps months, before he meets with a tree with which he has been familiar on the eastern side of the continent, and when he finds such an one, it exhibits a growth and appearance so different from that of the same tree at the east as to be not immediately recognized. The number of forest trees, exclusive of shrubs, found growing north of San Francisco and south of the Columbia, does not, probably, exceed fifty. These are distributed among the following genera: *Pinus*, 8; *Abies*, 5; *Picea*, 3; *Sequoia*, 2; *Cupressus*, 2; *Thuja*, 1; *Libocedrus*, 1; *Larix*, 1; *Taxus*, 1; *Torreya*, 1; *Quercus*, 5; *Populus*, 3; *Salix*, 5; *Fraxinus*, 2; *Acer*, 2; *Alnus*, 1; *Cornus*, 1; *Platanus*, 1; *Castanea*, 1; *Æsculus*, 1; *Arbutus*, 1; *Oreodaphne*, 1. Both in numbers of individuals and in size, the *coniferæ*, as has been mentioned, greatly preponderating. The annual vegetation which covers the prairie country of the valleys also presents an assemblage of forms quite new to the eastern botanist, and among them he will not fail to notice a greater relative number of liliaceous plants than in any part of the eastern States. The different mountain ranges he finds covered with vegetation which exhibits marked differences, and the areas which lie between and eastward of the coast ranges and Sierra Nevada, have each a flora so far peculiar to itself as to permit of its study in a degree apart from the others.

In order to trace the connection which exists between the physical geography of the region under consideration and the character and distribution of the plants which cover its surface, a general idea of the topography,* the climate, and geological structure of the different districts which it includes, is necessary.

Climate.—As is generally known, the climate of the Pacific coast, as compared with that of the Atlantic and the valley of the Mississippi, is much more equable, presenting no such extremes of heat or cold as that of the east, while the isothermal lines, when traced westward, are deflected to the north, striking the Pacific coast several degrees higher than the points where they pass that of the Atlantic. This seems to be due, in a great degree, to the influence of the prevalent westerly winds, which, constantly blowing in from the Pacific, assume the uniformity of temperature of the surface over which they pass. In the valleys of California the seasons are divided into wet and dry, rather than into cold and hot, while on the mountains snow falls to a considerable depth, and the severity of winter is proportioned to the altitude of the locality and its distance from the ocean. The summer temperature varies greatly in different localities, being extreme in the valleys of the interior, while in the mountains and on the coast a degree of heat is never suffered which is at all oppressive.

The annual precipitation of moisture exhibits even greater local variation than the tem-

* *Note by Lieut. Abbot.*—This subject is fully treated in Chapter I of the General Report.

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perature, being greatest toward the coast and northward, less on the southern than northern coast, and least in the interior.

Geological structure.—The geology of that portion of California and Oregon under consideration has been given somewhat in detail in the accompanying geological report. It will, therefore, not be necessary to repeat what has already been said upon the subject. The general characteristics of the geology of this region may, however, be said to consist in the great prevalence of comparatively recent volcanic rocks, and of a soil derived from their decomposition, in all the mountain ranges. In the valleys, and on the flanks of the coast mountains, tertiary strata, generally of sandstones, constitute the sub-structure, and give character to the soil. As compared with the valley of the Mississippi, and the more northern of the eastern States, the Pacific coast is much more recent, the greater part of it having emerged from the ocean since the middle of the tertiary period.

LOCAL BOTANY.

COAST MOUNTAINS.

Climate.—The climate of the immediate shore of the Pacific is quite unlike that of the interior, a difference dependent upon its proximity to the evaporating surface of the ocean, the ocean currents, and the prevalent winds. It is much more uniform, cooler, and more moist. The uniformity of temperature which it exhibits is due, unquestionably, to the equalizing influence of the nearly constant temperature of the wide expanse of open sea which lies adjacent to it, and over which the winds blow inland, almost without intermission, throughout the year. These winds, which are loaded with moisture, in summer usually blow from the northwest or west; in winter, from the southwest or west. The temperature upon the coast scarcely ever rises to what is called summer heat, and is never so high as to render other than woollen clothing comfortable. From observations* made at San Francisco, Fort Humboldt, and Fort Orford—localities which may be supposed to present fair samples of the climate of the coast—we find that the average temperature for the year, taking the mean of the observations of several years, is, for San Francisco, 54°.88; for Fort Humboldt, 52°.80, and, for Fort Orford, 53°.62. At San Francisco, the mean temperature for January being 49°.60; for July, 57°.90. At Fort Humboldt, for January, in 1854, 40°.83; for July, 56°.71. At Fort Orford, for January, 48°.38; for July, 59°.73. The low summer temperature of the Pacific coast of the North American continent, like that of the Atlantic, seems to be due to the Arctic ocean current, which constantly sweeps it. The amount of rain falling at the same points, as indicated by the same tables, is, at San Francisco, 23.59 inches; at Fort Orford, 68.52.

Vegetation.—The coast mountains, throughout nearly the entire distance from San Francisco to the mouth of the Columbia, are covered by a continuous forest, which is more dense towards the north. Immediately north of San Francisco the forest is composed almost exclusively of the red-wood, (*Sequoia sempervirens,*) and is limited to the valleys, especially such as open towards the coast. Going northward the trees become more numerous, and with the red-wood are found the sugar and yellow pine, (*P. Lambertiana and P. ponderosa.*) In the vicinity of Crescent City these trees combine to form one of the most magnificent forests in the world—the red-wood and the sugar pine attaining nearly equal gigantic dimensions; trees of both species being not uncommon 12 to 15 feet in diameter, and 300 in height. Near the line of 42° a marked change is noticed in the trees which constitute the forest, which is even, perhaps, more dense than

* Medical Statistics U. S. A.

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below. This is the northern limit of the red-wood. Thence northward, it is succeeded by the western white cedar, *Thuja gigantea*—Douglas' & Menzies' spruces; and these form the dense and almost impenetrable coating of vegetation which covers the coast mountains from Port Orford to the Columbia—Douglas' spruce here attaining its greatest dimensions, fully equalling those of the red-wood and sugar pine.

In the valleys of the Umpqua and other rivers, which discharge themselves into the ocean, *Quercus garryana* grows in groups and as solitary trees, in the open grounds. It attains a diameter of from 2 to 3 feet, and assumes the low and spreading form common to the oaks of the valleys of California and Oregon.

The undergrowth of the coast mountains is composed of so large a number of plants as to forbid their enumeration. Near San Francisco the shrubby undergrowth is made up, in a great degree, of the "wild lilac," (*Ceanothus thyrsiflorus,*) *Ceanothus rigidus*, and the bush lupine, (*Lupinus macrocarpus.*) About Port Orford, and thence northward, the "salmon berry" (*Rubus spectabilis*) is a conspicuous feature in the vegetation. It here grows to the height, sometimes, of six or eight feet, and bears a profusion of fruit, which is very attractive in appearance, and sometimes of excellent flavor. Thickets of *Rhododendron maximum* are of common occurrence, and by their stiff and tangled branches frequently form a serious obstacle to the progress of the traveller. Towards the Columbia, thickets, similar in appearance and character, are formed by *Ceanothus velutinus*. In the spruce forest, where not so dense as to exclude all undergrowth, the ground is covered with a carpet of the "salal" (*Gaultheria shallon*) and the Oregon grape, (*Berberis pinnata.*) Ferns and mosses grow in great abundance in some localities, furnishing very good indices of the moisture of the climate. Among the ferns, *Aspidium munitum* is the handsomest, *Pteris aquilina* the most abundant. Where the forest has been burned off, this last mentioned fern takes exclusive possession of the surface, and grows so dense and tall as to make the passage through it painful, even for one on horseback. In the transverse chains of mountains which run back from the coast to Mount Pitt and Mount Shasta, *Pinus Lambertiana*, *Pinus ponderosa* and *contorta*, *Picea grandis*, and, perhaps *Picea amabilis*, reach down nearly to the seashore.

SACRAMENTO VALLEY.

The geological structure of the Sacramento valley, with the characteristics of its soil, are given at some length in the second chapter of the accompanying geological report.

Climate.—The climate of the Sacramento valley affords a marked contrast to that of the coast. While the temperature in winter is never so low but that the grass is constantly green, and flowers, in the southern portions, perpetually in bloom, in summer the heat is intense to a degree never experienced in any portion of the eastern States.

The rain-bearing winds from the ocean during this season are either entirely excluded by the wall which bounds the valley on the west, or pass over to the Sierra Nevada, depositing none of their moisture. From May to November rain almost never falls, and neither clouds nor mist are seen during the greater part of that time. The effect of the sun's rays, beating down without obstruction into this enclosed area, is to elevate the temperature of the air frequently to 112°—115° Fah. in the shade, and to dry up and parch the surface to such an extent that the growth of annual plants is arrested as completely as by the snows and frosts of the winter of the northern Atlantic States. With the return of the autumnal rainy season vegetative life is

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again called into vigorous action, and the country, which a few weeks before was a desert, is now transformed into a flower garden.

Vegetation.—The peculiar climate which I have described has given to the Sacramento a vegetation very different from the district last considered. During the winter and spring the ground is saturated with moisture, and is everywhere covered with a dense growth of herbaceous plants.

After the month of May, however, the process of evaporation succeeds that of deposition, and by July the soil is dry and deeply cracked by the sun. The causes above enumerated have doubtless been most efficient in giving the Sacramento valley its broad expanses of prairie, and limiting the trees to a narrow belt bordering the streams; these timber belts being also governed as to their width and density by the magnitude of the streams which they follow, and the quantity of moisture derived from them, absorbed by their roots from the earth, or by their leaves from the air. Another feature of the climate of the Sacramento valley, common, also, to all the interior of California and Oregon, has had its effect in determining the character of the vegetation. From the fact, already mentioned, of the entire absence, during summer, of clouds or mist, the sun's rays are not only permitted to fall with extreme power upon the surface during the day, but the moment the heat ceases to be received from the sun it is radiated into space with equal facility, and, as a consequence, the nights are always cool—the mercury falling from above 100° to 75°–70° Fahr. during the night. The result of all these influences is, that the vegetation covering the greater part of the surface of the valley is not only annual in character, but runs through all its changes during the winter and spring; most of the plants having formed, and many of them cast, their seed before the 1st of July. Hence many of the wild and cultivated plants which occupy in their growth the whole of the tropical summer of the eastern States would not flourish here. Of this class, the Indian corn may be regarded as a typical example. We may here find the reason why its cultivation in California has been but partially successful.

LOCAL BOTANY.

The immense area in central and southern California, including the greater part of the Sacramento and San Joaquin valleys, as well as those portions of the coast mountains not occupied by forests, is covered with an almost uninterrupted growth of wild oat, (*Avena fatua.*) This plant is regarded by our best botanists as an importation from the Old World, and yet very few of those who see it as it grows in California can be made to believe that it was introduced by the early Spanish settlers, and is only naturalized, not indigenous. It now covers surfaces of many hundreds of miles in extent, both hill and plain, as completely as the grasses cover the prairies of Illinois. In early summer the districts where this plant prevails have all the appearance of being under high cultivation. The oat resembles very closely that cultivated at home, and frequently stands as thick on the ground as the grain in our fields. The hills and mountain sides bordering the bays of San Francisco and San Pablo are generally covered with the wild oat, and are destitute of trees, except that here and there, in the ravines and on the more broken surfaces, are a few grouped or scattered evergreen oaks, laurels, and buckeyes. Of these, the oaks (*Quercus agrifolia*) are low and spreading, having much the appearance of the apple trees in our orchards, and, combined with the wild oat, give to the country a civilized and cultivated aspect. On the low lands, bordering the bays I have mentioned, a great variety of flowering annuals find a place, and on the richer slopes of the hills dispute possession with

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the wild oat. These plants give the gay and varied appearance to the botany of the region, which has been remarked by all who have visited it at the proper season.

In the valleys of Napa and Sonoma the climate is intermediate in character between that of the coast and the interior, the extremes of each being tempered to produce a mean in the highest degree healthful, agreeable, and favorable to the development of vegetation. Here we find, besides a great profusion of annual plants, the California white oak, (*Q. Hindsii*,) which grows solitary or grouped in the manner of the evergreen oak, but attaining a much greater size. Here also, for the first time, we met with the nut pine, (*P. sabiniana*,) a tree highly characteristic of the flora of the interior, and generally distributed through the coast mountains back from the ocean. The *Manzanita* and several species of *Ceanothus* form shrubby clumps and thickets. Here, as elsewhere in this region, the lupins, one of which (*L. macrocarpus*) is shrubby, form a marked feature in the vegetation. About Benicia, the rounded hills are everywhere covered with wild oats, and no trees are visible except the evergreen oak, which forms low and limited groves in the ravines among the hills and on the slopes of Mount Diablo. The shores of Suisun bay, as well as the borders of the lower Sacramento and San Joaquin rivers, exhibit wide expanses of tule, (*Scirpus lacustris*,) which forms in its abundance a striking peculiarity of the botany of all portions which we visited of California and Oregon. The reasons for the prevalence of this plant are, however, probably to be found in the imperfect drainage of much of the surface, rather than in any peculiarities of soil or climate. The low lands bordering the belt of tule which encircles Suisun bay, are in many places covered and reddened by the *Canchalagua* (*Erythrea Muhlenbergii.*) The botany of Suisun valley exhibits many of the characteristics of that of the valleys of Napa and Sonoma. The soil, which is, for the most part, derived from the decomposition of sandstone rock, was originally covered with the wild oat, which here grows in great luxuriance, and with beautiful trees of the Californian white oak, (*Quercus Hindsii.*) A large part of the surface is now under cultivation, and at the time we traversed it was covered with wheat just ready for the reaper. It exhibited a vigorous growth, and, as I was informed by the farmers, produced from 25 to 50 bushels to the acre; the yield being greatly affected by the degree in which the great want of the region, that of water, was supplied.

At Vacaville we left the foot hills of the coast mountains, traversing the valley of the Sacramento diagonally to the foot hills of the Sierra Nevada, near the upper end of the valley. The rolling surface of the foot hills, on either side of the Sacramento, is covered with wild oat, scattered trees of the oaks I have mentioned, and, in the more rocky places, the nut pine. The plain bordering the river exhibits surfaces of different characters, and covered with differing vegetation. The upper terrace is frequently gravelly, and sustains a sparse growth of coarse grasses, of *Eryngium*, *Hemizonia*, *Madaria*, and other rough or viscous plants; such surfaces being comparatively sterile and of little value for cultivation. The alluvial plain immediately bordering the river possesses a fine and fertile soil, and is covered with a dense growth of wild oat, *Artemisia*, and other plants. The banks of the streams are lined with belts, of greater or less width, of timber, which are composed chiefly of the long-acorned oak, (*Q. Hindsii*,) here exhibiting a size and beauty of form not surpassed, if equalled, by the oaks of any other part of the world. Along the water's edge, the sycamore, (*P. Racemosa*,) *Fraxinus Oregona*, the cotton-wood, (*P. Monilifera*,) and two species of salix, (*S. Hindsiana* and *S. lasiandra ?*,) are overgrown by grape vines, (*Vitis Californica*,) and form a screen, by which the view of the river is frequently shut out from the traveller upon its banks. At the north end of the valley,

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along the river, and on the hills which border it, are found many plants not met with below. Of the trees, *Q. Hindsii*, *Q. Garryana*, and *Q. Agrifolia*, the "nut pine," and cotton-wood, were the most common. Among shrubs, on the higher lands, were the *Manzanita*, *Fremontia*, and *Ceanothus cuneatus*, here forming thickets; near the river bank, *Cephalanthus occidentalis*, *Cercis occidentalis*, *Calycanthus occidentalis*, *Eriodictyon glutinosum*, *Rhus diversiloba*, *Alnus viridis*, and *Alnus Oregana*, the latter forming a tree fifty feet in height.

BOTANY OF SIERRA NEVADA.

The Sierra Nevada, with its continuation, the Cascade range of Oregon, forms a distinct botanical district, characterized not only by the presence of many plants not found on the Coast Range or in the valleys, but by the prevalence of certain species throughout this entire mountain system. Its general altitude and the peaks, which, at many points, rise high above the line of perpetual snow, give an Alpine character to much of its vegetation, even in a low latitude. From the observations of many botanists who have crossed the Sierra Nevada in southern California, we learn that the different zones of vegetation which mark the different grades of altitude include many plants which, on the less elevated surfaces, are separated by several degrees of latitude. Of these, the Douglas spruce, the western balsam fir, and several other trees which compose a large part of the forests covering the banks of the Columbia, extend at a higher elevation quite to the northern line of Mexico. The number of these widely distributed species, among which should also be included very many annual plants, gives a unity of character to the botany of this mountain range which requires it to be regarded as a distinct botanical district. The influences which have most contributed to form or modify this flora are probably to be found in the continuity and the uniformity of geological structure and altitude of this mountain system, the similar relations which its different parts hold to the ocean from which they derive the marked similarity of their climate.

The western slope of these mountains receives a copious precipitation from the winds coming in from the Pacific over the coast ranges and the valleys. As a consequence, it is generally clothed with a dense forest. This forest is composed almost exclusively of coniferous trees, and, with the exception of the red-wood, includes all those gigantic forms of vegetation so characteristic of the botany of western America. On the western slope of the Sierra Nevada, in California, is found the famous group of Sequoias, which, from their unequalled magnitude, have very properly received the name of *gigantea*, in common language only known as the "mammoth trees." The yellow pine, (*P. Ponderosa*,) the sugar pine, (*P. Lambertiana*,) the western balsam fir, (*Picea grandis*,) and (*Libocedrus decurrens*,) comprise the greater part of the forests which cover this slope as far down as the latitude of San Francisco; the yew, (*Taxus brevifolia*,) and two species of cypress, (*C. nutkatensis and C. Lawsoniana*,) being also occasionally met with. Among the foot hills, at a lower level, the nut pine mingles with the oaks, reaching up to the pine forests above, but scarcely forming a part of them. In the same zone are *Quercus fulvescens*, *Quercus densiflora*, and *Quercus Kelloggi*, which do not, however, occur in any considerable numbers.

LOCAL BOTANY.

In crossing the Sierra Nevada, over the base of Lassen's butte, for twenty miles our route, gradually ascending, led among grooves of the three species of oak which I have mentioned as prevailing about Fort Reading, with scattered trees of the nut pine, the greater part of the

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surface being, however, covered with thickets of *Ceanothus*, *Purshia*, *Spiræa*, *Amelanchier*, *Cercis*, *Fremontia*, *Manzanita*, a low scrub oak, (undescribed,) and a wild plum, (*P. subcordata.*) At an altitude of about 3,000 feet we entered a dense forest composed—with the exception of a single oak, (*Q. Kelloggi*,)—of coniferous trees, the sugar and yellow pine, *Libocedrus*, and balsam fir, all attaining a very large size. At McCumber's, at an elevation of 4,000 feet, the forest was composed exclusively of coniferous trees, and was, in many places, very dense. The natural meadows, of which McCumber's flat is one, are covered with a luxuriant growth of annual plants, of which I collected nearly a hundred species in a few hours. As a whole, however, the catalogue does not differ greatly from one which might be made at Fort Reading, or in Sacramento valley, earlier in the season; but while, at this time, (July 29,) the plains of the Sacramento were completely dry, and the flowers of spring had long since passed, here everything was fresh and green, and the meadows were decked with flowers at the period of their greatest beauty. In the pine forest, the snow berry, (*Symphoricarpus*,) *Rubus nutkanus*, (*a variety of R. odoratus?*) *and Epilobium angustifolium*, grow everywhere, and the ground is in many places covered with mats of *Ceanothus prostratus*. Lillies and fritillarias also form a marked feature of the pine woods here as elsewhere. As we ascended to the summit of the pass, at an altitude of about 5,000 feet, we left behind us most of the trees which I have mentioned, and found the forest of the higher portion of our route composed exclusively of the yellow pine. About the base of Lassen's butte, where, over a large area, the forest had been burned off, it has been succeeded by dense thickets of *Ceanothus* and *Manzanita*, and along the banks of a stream coming down from the snow I noticed a *Cornus*, having much the general aspect of *C. Florida*, of the eastern States, but evidently quite distinct, (*C. pubescens.*) On the eastern slope of Sierra Nevada we found the forests much less dense, and composed of a smaller number of elements. The yellow pine here formed nine-tenths of all the arborescent vegetation, and grows to a larger size than on the western side of the mountains. This slope is evidently not so well watered as the other, and even among the mountains, in various localities, we found level surfaces, of which the light volcanic soil supported only bunches of *Artemisia* and *Purshia*, with scattered yellow pine trees, outliers of the sage plains, so characteristic a feature of the region lying east of the mountains.

BOTANY OF THE DISTRICT LYING EAST OF THE SIERRA NEVADA AND CASCADE MOUNTAINS.

Descending to the eastward from the summit of the western range of the Sierra Nevada, we came into a region of which the geological structure and physical features are fully described in the geological report. The general monotony of the geological structure of this area finds a perfect parallel in the simplicity and uniformity of its vegetation. Throughout all the interval lying between the Cascades and Sierra Nevada and the Rocky mountains, the causes which have given character to the vegetation have been exceedingly general in their action. The climate is everywhere characterized by the absence of moisture, which, with the exception of the mountain summits, which project above the general level, gives to the surface a character to which the name of desert has not been inappropriately applied. The general aspect of the botany of this region is made up of three distinct elements. Of these the first is presented by the grassy plains which border the streams flowing down from the mountains. On these surfaces grows a considerable variety of annual vegetation, in its general character not unlike that of the Sacramento valley. The second of these botanical phases is that of the sage plains; surfaces upon

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which little or nothing else than clumps of Artemisia will grow. The third is formed by forests of yellow pine, (*P. ponderosa*,) which apparently finds on these arid surfaces its most congenial habitat. It sometimes happened to us that, during a whole day's ride, we were passing through a continuous forest of these yellow pine trees, in which scarcely a dozen distinct species of plants could be found.

LOCAL BOTANY.

BANKS OF PIT RIVER.

After leaving the Sierra Nevada, the botany of no part of our route, before we reached the Klamath lakes, requires especial notice. Most of the plants collected on the banks of Pit river are identical with those before collected in the Sacramento valley. On the mountain range which forms the upper cañon of Pit river we first found a cedar, (*J. occidentalis*,) which fills precisely the same place in the botany of the west that the red cedar of Virginia does in that of the east. We here, too, for the first time, met with the "bunch grass," (*Festuca scabrella*,) which is found in all parts of the region under consideration, and now constitutes by far its most important vegetable production. This is an exceedingly nutritious grass, and was our main dependance for the subsistance of our mules in all parts of our route, between the lower cañon of Pit river and the Columbia. It grows in bunches, as its name implies, and in that dry climate, "curing" as it stands, forms a valuable fodder, and one highly relished by cattle and horses, even when it has the appearance of being perfectly worthless.

SHORES OF THE KLAMATH LAKES.

About the Klamath lakes, and along the banks of Klamath river, a better supply of moisture has produced a more vigorous and varied vegetation than in most parts of the surrounding country. A large number of annual plants was there obtained, many of which are unknown in the valleys of California and Oregon, as will be seen by reference to the catalogue of the plants collected. The immediate borders of the lakes are covered with a growth of tule, (Bull-rush and Cat-tail flag,) similar to that which borders the Sacramento. On drier ground, but still in the vicinity of the water, are thickets composed of *Pyrus rivularis*, *Prunus subcordata*, *Rhamnus Purshianus*, and wild cherry, (*Cerasus emarginata*,) all of which, at the time of our visit, were loaded with fruit. On the hill sides are several species of *Ribes*, which, with the wild plum and *Amelanchier*, form another series of thickets equally fruitful with those below, and with them constitute the favorite feeding grounds of the bears.

The number of trees in this vicinity is small. A few cotton-woods and willows are found in the neighborhood of the water, while the hills are covered with yellow pine and the western cedar. On the banks of Klamath river we found *Pinus contorta*, generally forming a dense forest of trees of small size. The botany of Klamath marsh and the country about it is similar in all respects to that just described, except that nearly half the surface of the marsh is covered with the broad leaves of the yellow pond lilly, *N. advena?* here exhibiting a vigor of growth that I have never seen equalled in the eastern States. The capsules which contain the seeds have somewhat the form, and are fully as large as hen's eggs, and are filled with seeds, which form an important part of the subsistence of the Indians who reside in the vicinity.

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BOTANY OF THE DES CHUTES BASIN.

The botany of this area has the general characters of that of Klamath basin, except that, as we descend towards the Columbia, the forest of yellow pine gives place to scattered trees of the western cedar, which are, in time, succeeded by a growth of bunch grass, covering the country as exclusively as does the wild oat the valleys of California. Near the Columbia, the streams are bordered by *Quercus garryana*, which does not, however, here attain the size of the same species in the valleys of the Willamette and Umpqua.

BOTANY OF THE CASCADE MOUNTAINS.

As has been mentioned, the general features of the botany of the Cascade mountains is similar to that of the Sierra Nevada of California, the greater portion of the species which compose it extending southward as far as San Francisco. There are, however, many species, both of trees and minor plants, which, quite local in their range, yet in certain districts represented by great numbers of individuals, give a peculiar character to the prevalent vegetation. There are other plants, which, common in the vicinity of the Columbia, do not extend southward below the California line. Of these the western larch, (*Larix occidentalis*,) and *Abies Williamsonii* may be taken as examples.

LOCAL BOTANY.

In the vicinity of the Three Sisters we several times crossed and recrossed the main crest of the Cascade mountains, and were able to study, very carefully, the different belts of vegetation visible on the mountain sides, from the snow line down to the Des Chutes basin, on the east, and to the Willamette valley on the west. At this point, the plain bordering the Des Chutes, having an altitude of about 4,000 feet, is covered with a continuous forest of yellow pine.

Along the streams coming down from the mountains are a few trees of the western larch, nowhere in this vicinity found at a much greater elevation than the plateau I have mentioned. With the larch are occasionally mingled *Populus tremuloides*, *P. monilifera*, and *P. angustifolia*. A few hundred feet up the mountain side the yellow pine is joined by the sugar pine and *Pinus contorta*, the western balsam fir, and Douglas' spruce, all of which combine to form a thick forest. With these also are occasionally seen few and small trees of the western *Arbor vitæ*, (*T. gigantea*,) and the large-leaved maple, (*Acer macrophyllum*.) A little higher we found *Pinus monticola* of Douglas, to me scarcely distinguishable from the white pine of the eastern States, and the silver fir, (*Picea amabilis*.) At the height of 6,000 feet the trees which I have mentioned had all given place to *Abies Williamsonii* and *Pinus cembroides*, which rise to the line of perpetual snow. As we descended toward the west these two species were again succeeded by those I have mentioned as occurring on the eastern slope, but mingled in different numerical proportions, the most abundant species, and those constituting the great mass of the forest, being the Douglas spruce, the balsam fir, and the western *Arbor vitæ*. Here we found, for the first time, the *Nootka cypress*, which was confined to the western slope of the mountains. The under shrubs of the forest, on the western slope, consisted of the chinquapin (*Castanea chrysophylla*,) *Rhododendron*, two species, *Arctostaphylos tomentosa*, and *Spiræa ariæfolia*, the ground being covered with *Berberis*, "Salal," and ferns, as in the forests of the coast mountains, to which that of the western slope is like in all essential particulars. On the alpine summits of

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the Cascades, at this point, were collected about fifty minor flowering plants, some of peculiar interest. Of these, *Menziesia empetriformis*, *Saxifraga Tolmœi*, and *Pentstemon Menziesii*, covered large surfaces with their flowers, and, with the gentians, recalled the heaths and other alpine plants of the Old World.

The Cascade mountains, in the vicinity of the Columbia, are covered with a forest similar in character to that which I have described, but in which by far the largest number of trees are Douglas' spruce and the western balsam fir. Here, as on the coast mountains, where the forests have been burned off, the ground is covered with a rank growth of *Pteris aquilina*. The banks of the Columbia, along the water's edge, are lined with cotton-woods, and in some places with Garry's oak.

The lower part of the Willamette valley is occupied by the densest forest which I saw at the west, composed principally of Douglas' spruce, here known as the red fir, the western balsam fir, called by the inhabitants the white fir, the hemlock spruce, and arbor vitæ. Of dicotyledonous trees almost the only ones are the large leafed maple, the vine maple, (*Acer circinata*,) and *Cornus Nuttallii*. The upper part of the valley consists, for the most part, of prairie, covered with a luxuriant growth of grass, while the borders of the streams are lined with oaks, as in the Sacramento valley. The annual vegetation, which is quite varied, includes a large number of species found in California, with others better suited to a more northern latitude and a moister climate.

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CHAPTER II.

DESCRIPTIONS OF THE FOREST TREES OF NORTHERN CALIFORNIA AND OREGON.

ÆSCULUS CALIFORNICA, *Nutt.* The California Buckeye.
Æ. CALIFORNICA, *Nutt. Torr. & Gray, Flor.* 1, *p.* 251.
Æ. CALIFORNICA, *Nutt. Sylva,* 2, *p.* 69, *t.* 74.

Fig. 1.

Fig. 1. Leaves and flowers of *Æ. Californica,* ½ natural size, and a flower of the natural size.

Description.—A shrub, or low spreading tree; leaflets 5, lanceolate or elliptical, acuminate, narrowed toward the rounded base, serrulate, glabrous, glaucous, or colored below; flowers large in a dense thyrsus, six inches long by three in diameter; petals rose-colored, spreading widely, shorter than the stamens; calyx unequally 5-parted; stamens 5–6; fruit large, spheroidal, somewhat pointed, slightly tuberculated.

The Californian buckeye grows abundantly in most parts of the Sacramento valley, par-

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ticularly on the banks of streams, in ravines, and about rocky ledges. It generally forms a diffusely branching shrub, eight to ten feet high, often flowering and fruiting freely at the height of five or six feet.

The largest individual which I saw was near Benicia; an upright tree some twenty feet in height, with an open spreading head; trunk about a foot in diameter near the ground; on it were growing several branches of mistletoe, (*Viscum flavescens.*)

The flowers are larger, and much more widely expanded than in Nuttall's figure, (l. c.) In this respect it differs strikingly from the eastern species. Another peculiarity indicated in the figure given, (fig. 1,) is the successive appearance of the flowers during most of the spring and summer. As late as the last of July, I found on each thyrsus a large number of unexpanded flower buds. From the beauty of the flowers, and the long time during which they continue to appear, it would be a highly valuable acquisition to the cultivators of ornamental shrubs in the eastern States.

The wood is soft, white, and brittle, like that of the other species of the genus.

ACER MACROPHYLLUM. The Large-leaved Maple.
A. MACROPHYLLUM. *Pursh. Flor.* 1, *p.* 267.
A. MACROPHYLLUM. *Hook. Flor. Bor. Amer.* 1, *p.* 102, *t.* 38.
A. MACROPHYLLUM. *Nutt. Sylva* 2, *p.* 76, *t.* 67.

The large leaved maple is commonly distributed throughout those portions of Oregon which we visited, the Cascade and Coast mountains, and the Willamette valley. It is usually found in the evergreen forests, always far outnumbered by the firs and spruces with which it is associated, but frequently forming a marked feature of the arborescent vegetation; its immense leaves making it conspicuous wherever seen.

Though much the largest of western maples, this species never attains the dimensions of the "hard" and "soft" maples of the east.

I do not remember to have seen an individual more than eighteen inches in diameter three feet from the ground, though, from the circumstances in which it usually grows, it is taller than its diameter would indicate.

The flowers, hanging in long racemes, are very ornamental, and, with the large pale green leaves, render it well worthy of cultivation for ornament.

The leaves are frequently more than twelve inches in diameter, though usually from eight to ten.

The wood of this maple is close-grained and hard, and furnishes almost the only hard wood timber attainable in the wooded portions of Oregon; the oaks being, for the most part, confined to the open country, and having a low spreading form, so as to furnish little good timber.

ACER CIRCINATUM. The Vine Maple.
A. CIRCINATUM, *Pursh., Flor.* 1, *p.* 266.
A. CIRCINATUM, *Hook. Flor. Bor. Amer.* 1, *p.* 112, *t.* 39.

It is perhaps doubtful whether this plant should be called a tree or shrub, as it has not the upright form of most trees, and rarely attains a greater diameter of trunk than five or six inches. It is exceedingly common throughout the coniferous forests of central and western Oregon, and is sure to bring itself to the notice of the traveller by the obstacles which it presents to his passage through the forests where it grows.

It has received its name from its peculiar habit, which is so far vine-like, that the slender

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trunks—several springing from the same root—arch over till the top touches the ground, when it takes root. Where the clumps of vine maple are numerous, and, as is frequently the case, they are contiguous, their intermingled and rooted branches constitute an almost impassable barrier to the traveller.

The vine maple requires considerable moisture for its vigorous growth, and it therefore becomes more and more abundant as one approaches the coast. There, in many localities, it forms thickets, which are regarded by the inhabitants as well nigh impenetrable.

The foliage of the vine maple in its general aspect resembles that of the sugar maple of the east. The wood is hard, heavy, and fine grained, and is much used for small articles, when these qualities are required.

Acer glabrum, Torr., and *Acer tripartitum*, Nutt., are shrubs, which are not uncommon in the Cascade mountains.

ARCTOSTAPHYLOS GLAUCA, *Lindl.* (Plate III.) Manzanita.
A. GLAUCA, *Lindl.*, *Bot. Reg. t.* 1791.
XEROBOTRYS GLAUCUS, *Nutt.*, *Trans. Amer. Phil. Soc.*

Description.—A large evergreen shrub, growing in clumps; bark red, exfoliating; leaves ovoid, smooth, coriaceous, entire, set vertically; flowers in terminal racemes, urceolate, pinkish white; fruit spheroidal, flattened, black, smooth; seeds triangular, rough.

This shrub is highly characteristic of the Californian flora, being abundant on all the hills and mountains, and extending northward into Oregon; near the Columbia, however, it is generally replaced by *A. tomentosa*, which has much the same habit, and is very closely allied to it, but apparently specifically distinct. The manzanita has received the Spanish name which it bears from a fancied resemblance of its fruit to a little apple.

It usually grows in clumps, six, eight, or ten feet in height, divided into many trunks, which are rarely larger than one's arm, covered with a red exfoliating bark.

The evergreen leaves are oval in form, about an inch in length, thick and shining, and (unlike those of most plants) are set vertically. The flowers are urn-shaped, considerably resembling those of some species of *Vaccinium*. The fruit grows in clusters, and is first white, subsequently red, and finally black. It has the form of a flattened spheroid, a quarter to three-eights of an inch in diameter, and is nearly filled with triangular stony seeds. These seeds are covered by a pulp, which has the consistence and taste of that of the fruit of the "Black Haw."

The *manzanita* berry is regarded as eatable, and is the favorite food of the grizzly bear. It was frequently eaten by our party, but in most circumstances is too dry, and has too little flavor to be highly relished. As an ornamental shrub, the *manzanita* is well worthy of introduction into the parks and pleasure grounds of the eastern States; and since it grows up to the line of perpetual snow on the mountains of California, it would doubtless be hardy in any part of the Union.

The wood of this shrub is very dense and hard, of a reddish color, and somewhat resembles that of the apple tree. No use is made of it in the arts at present, except that rustic seats are sometimes formed from its crooked and twisted branches; for which purpose it is exceedingly well adapted.

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ARBUTUS MENZIESII, *Pursh.* The Madroña.
A. MENZIESII, *Pursh. Flor.* 1, *p.* 282.
A. PROCERA, *Dougl. Mss. Hook. Flor. Bor. Amer.* 2, *p.* 36.

Fig. 2.

Fig, 2. Branch with leaves and fruit of *A. Menziesii*, ½ natural size.
Fig. 2*a*. Flowers of *A. Menziesii*, ½ natural size.

Description.—A small tree, 25-30 feet high, 12 inches in diameter at base; bark exfoliating, green or reddish, according to the season, very smooth; leaves oval, petiolate, entire or subserrate, very smooth above, glaucous below; flowers urceolate, in elongated and clustered pubescent racemes; berries red, rough, many-seeded, ornamental.

The Madroña, as it is called in California, has a wide range on the Pacific coast. It is not uncommon in the Sacramento valley, and the largest trees of it which I saw were on the banks of the Willamette, in Oregon. It ranges north of the Columbia, and in that vicinity is called the laurel.

The large, thick and shining leaves, and the smooth and colored bark, give this tree a tropical look, recalling the *Magnolia grandiflora* of the southern States by its general aspect. The berries are red, (at least were so in Oregon in November,) and resemble morello cherries; when ripe they are quite ornamental, and are said to be sometimes eaten. They, with the rich foliage, flowers, and colored bark, render it one of the handsomest trees which I saw at the west. It is already adopted as an ornament to grounds in California, and is well worthy of an effort for its introduction into the eastern States.

The wood, like that of the manzanita, is very hard and fine grained.

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CORNUS NUTTALLII. Nuttall's Cornel. *Nutt. Sylva,* 3, *p.* 51 *to* 97.

The general appearance of this fine species is much like that of *C. florida* in leaf, flower, and trunk, but in the size of all its parts it is without a rival in the genus. It grows abundantly in the dense forest bordering the Willamette and Columbia, at their point of junction, where it attains a height of 75 feet, and a diameter of 12—18 inches.

The wood is dense and hard, like that of *C. florida,* and is used by the inhabitants for similar purposes.

The fruit of *C. Nuttallii* is not, as represented in Nuttall's figure, (l. c.,) similar to that of the common "dogwood," but is consolidated into a compact capitulum, each drupe being compressed into a prismatic form by its fellows. The color of the drupe is scarlet, like that of *C. florida,* the extremity being black. The heads are an inch in diameter, and have a very pretty appearance on the tree.

OREODAPHNE CALIFORNICA, *Nees.* The Californian Laurel.
TETRANTHERA? CALIFORNICA. *Hook. & Arn. Bot. Beech. p.* 159 & 389.
LAURUS? REGIA. *Dougl. in Comp. Bot. Mag. v.* 2.
UMBELLULARIA CALIFORNICA. *Nutt. Sylv.* 1, *p.* 87.

Fig. 3.

Fig. 3. Leaves, flowers, and fruit of *O. Californica,* ½ natural size.

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Description.—A tree of moderate size; foliage evergreen; leaves oblong-lanceolate, pointed, scarcely acute, reticulately veined; peduncles; axillary simple; flowers numerous, involucred; fruit roundish-elliptical.

The "California laurel" forms the handsomest dicotyledonous tree within the limits of the State. The foliage is dark green and lustrous, and persistent throughout the year. The tree, as generally seen, is of small size, twenty to thirty feet in height, and rather inclined to form groups of several individuals. It has very much the general appearance of the European laurel, (*L. nobilis*,) and is quite as ornamental.

It is said to attain, in some parts of California and Oregon, much greater dimensions than any individuals which I saw, and to form a very elegant and imposing tree.

The leaves, when rubbed or burned, give out a strong aromatic odor, which excites sneezing. The residents of California are very cautious about burning the plant, more especially the leaves, as it is said that a vapor is driven from them by the fire in the highest degree injurious. Of this there is, however, much doubt.

The fruit, which is accurately represented (half size) in the figure, is not usually globular, as has been stated, but somewhat elongated and elliptical. All that I saw was green or greenish yellow, but it is said to become purple when ripe.

FRAXINUS OREGONA. The Oregon ash.
F. OREGONA. *Nutt. Sylv.* 3, *p.* 59.

This forms a low spreading tree, which grows commonly along the banks of the Columbia. I also saw it on several occasions on tributaries of the Sacramento, in the upper part of the Sacramento valley.

I never saw it attaining a greater size than a foot in diameter by thirty to forty feet in height.

ALNUS OREGONA. The Oregon alder.
A. OREGONA. *Nutt. Sylv.* 1, *p.* 28, *t.*

The Oregon alder forms a tree sometimes of fifty to sixty feet in height, and is generally distributed throughout northern California and Oregon. Like other species of the genus growing along the banks of streams, its form is upright and handsome, and the trunk sometimes two feet in diameter near the ground.

The leaves are thicker, and, in large trees, smaller than those of *A. viridis* or *A. serrulata*.

The wood is brittle, and not to my knowledge employed for any useful purpose.

POPULUS TREMULOIDES. The quaking aspen.
P. TREMULOIDES. *Michx. Flor. Amer.* 2, *p.* 243.

The aspen grows throughout all parts of the region east of the Cascade mountains and Sierra Nevada which we visited. It forms a marked feature of the vegetation of the slopes of these mountains where the forests of the higher lands border the sage plains of the central desert. It is here seen in long lines of trees of small size, marking the courses of the many mountain streams which are in summer absorbed by the arid surfaces of the plains soon after leaving the mountain sides. For a time we were often deceived by the poplars and willows, regarding them as indications of the presence of water, but we soon learned that they were only a sign that water was to be found in their vicinity at some time during the year.

Alders we found to be much better guides to water, as they will only follow the courses of the streams just so far as they are permanent, and no further; and we never failed, even near the close of the dry season, to find the roots of the alders washed by living water.

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CASTANEA CHRYSOPHYLLA, *Dougl.* The western chinquapin.
C. CHRYSOPHYLLA, *Dougl. Hook. Flor. Bor.-Amer.* 2, *p.* 159.
C. SEMPERVIRENS, *Kellogg. Proc. Cal. Acad. Sc.* 1, *p.* ——.

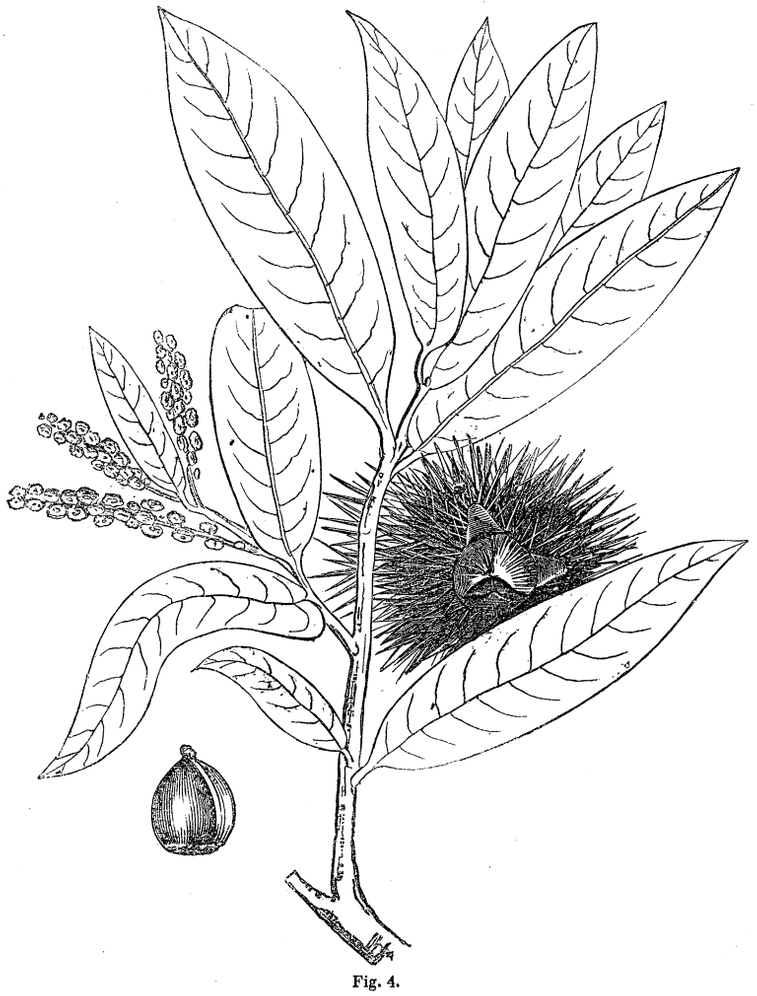

Fig. 4.

Fig. 4. Branch, leaves, male flowers, and fruit of *C. chrysophylla*, natural size.
Fig. 4*a*. Nut of *C. chrysophylla*, natural size.

Description.—An evergreen shrub or tree of California and Oregon. Leaves broad-lanceolate, acute, thick, entire, glabrous, dark green above; below covered with a golden-yellow powder; aments clustered at the ends of branches, two inches long, usually with a few female flowers at the base; nuts triangular, pointed; testa hard, of a light-brown color; each nut enclosed in a very spinous burr; fruit agglomerated; kernel eatable.

We found the chinquapin growing in great abundance in the mountains of California and Oregon. It usually forms a low shrub, fruiting freely when not more than three feet in height. In the Cascade mountains of Oregon, however, it forms a handsome tree thirty feet in height, having a grayish-green smooth bark, very much like that of the young chestnut. It is said sometimes to attain the height of sixty feet. The contrast of color between the upper and lower surfaces of the leaves has a fine effect, making the plant well worthy of cultivation for ornament. The nut contains a kernel which has an agreeable taste, and is much sought by the

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squirrels. The shell of the nut is much harder than that of the eastern chinquapin, and the two species are in all respects unlike.

It is quite common to find ripe fruit and freshly-blown flowers on the same plant at the same time; indeed, I think that was the general rule when the specimen figured was collected, on the head-waters of the Des Chutes river, in Oregon, August 30. Hooker's brief description (l. c.) is applicable to the plant wherever I saw it, except that he represents the aments as confined to the axils of the leaves, and to be not more than an inch in length; whereas I often found the aments not only in the axils of the upper leaves of a branch, but exclusively occupying the extremity. The aments in my specimen are twice as long as in his.

QUERCUS FULVESCENS, *Kellogg*. The Fulvous Oak.
Q. FULVESCENS, *K. Pro. Cal. Acad. Sc.* 1, *p.* 67 and 71.
Q. CRASSIPOCULA, *Torr. Bot. Whipple's Rep. p.* 137.
Q. CRASSIPOCULA, *Bot. Williamson's Report, p.* 365, *t. IX.*

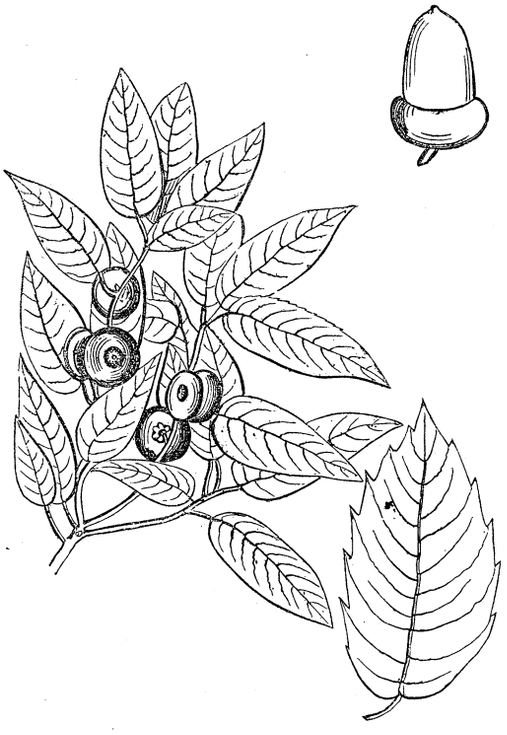

Fig. 5.

Fig. 5. Branch of *Q. fulvescens*, with young fruit, half natural size.
Fig. 5*a*. Toothed leaf of *Q. fulvescens*.
Fig. 5*b*. Mature fruit, half natural size.

Description.—Tree of medium size, spreading; leaves oblong-ovate, acute, toothed, or entire; when toothed, teeth remote, acute, callous at point, confined to upper half of leaf; veins beneath villous; petioles fulvous; gland sessile; when young, flat, wheel-shaped, nearly concealed in the cup; when mature, long-ovoid, 1½ in. long, 1 in. broad; cup saucer-shaped, thick, velvety, fuscous, enclosing 1 1-5 of the gland.

This pretty oak occurred on the line of our route only on the banks of Canoe creek, in the western range of the Sierra Nevada, northeast from Lassen's butte. It there formed rather a large shrub than a tree. It is, however, here near the northern line of its range; and on the

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Sierra Nevada of central and southern California it is said to attain a greater size, but never to become a large tree.

The leaves were thick and shining above, glaucous below, having some resemblance to those of the golden-leafed chestnut. The acorns were small, flat, and nearly concealed in the smoothish, wheel-shaped cup. At that time I supposed that it was decidedly an over-cup oak. On my return to San Francisco, in the autumn, I learned, for the first time, from my friend Dr. Kellogg, the changes which take place in the development of the acorn. This finally emerges from the cup to a degree equal to that of any other of the Californian oaks. The cup retains, to a considerable extent, its original form, but is much thickened. The name *Crassipocula*, given to this species by Dr. Torrey, is very appropriate, but was anticipated by that of Dr. Kellogg.

Of the wood of *Q. fulvescens* I obtained no information, except that the small branches are tougher, and the wood apparently denser, than in most of the oaks of the west; of which, the wood, as a general rule, is brittle.

QUERCUS KELLOGGII, *Newb.* Kellogg's oak.
Q. TINCTORIA, var. CALIFORNICA. *Torr. Bot. Whipp. Rep. p.* 138.

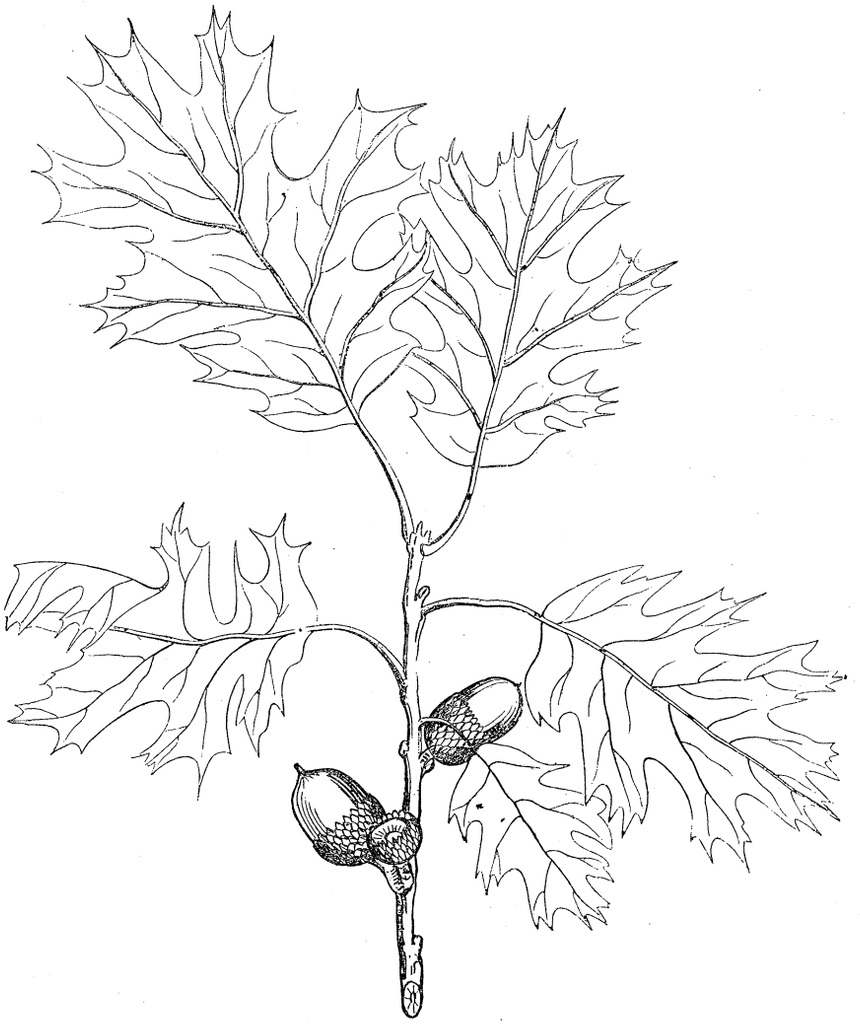

Fig. 6.

Fig. 6. Branch, leaves, and acorn of *Q. Kelloggii*, ½ natural size.

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Description.—A tree of medium size; leaves deeply sinuate, three principal lobes on either side, which terminate in several acute points, glabrous above and below. Fruit solitary or clustered, nearly sessile, gland roundish-ovoid, or, more commonly, elliptical, terminating in an accute projecting point, greenish brown in color, 1 to 1½ inch long, cup hemispherical, covered with elongated acute scales.

This oak is found in different parts of California, but, apparently, does not extend northward beyond the Oregon line. I have specimens collected both south and north of San Francisco, in the coast mountains, and we found it occurring in considerable numbers between Fort Reading and Lassen's butte, on the western slope of the Sierra Nevada, in northern California. Where we observed it, it forms a tree of small, or, at most, moderate size, and of a straggling, irregular growth. About McCumber's it is the only deciduous tree growing in the pine forest.

Its resemblance to *Q. tinctoria* and to *Q. coccinea* of the eastern States is striking, but it is difficult to say to which it is most closely allied. The leaves are smoother and the lobes more acute than is usual with those of *Q. tinctoria;* in these respects more resembling *Q. coccinea.* In the general aspect of the trunk and bark it is, however, more like *Q. tinctoria.*

The fruit is much larger and generally of a different form from that of either of the allied species, the acorn being frequently more than an inch in length by ⅝ of an inch in diameter; when fully grown they are rather cylindrical than ovoid, uniformly rounded at the ends, and with a prominent point at the summit. The cup is hemispherical, covered with ovoid acute scales.

The differences of habit from the eastern species which it exhibits, as well as the differences of leaves and fruit, lead me to regard it as distinct; and I have dedicated it to my friend Dr. A. Kellogg, of San Francisco, who is devoting himself with so much industry and success to the study of the plants of his adopted State.

QUERCUS HINDSII. (Plate I.) The long-acorned oak.
Q. HINDSII. *Benth. Bot. Sulph. p.* 55.
Q. LONGIGLANDA. *Torr. Frêmont's Geog. Mem. of California.*

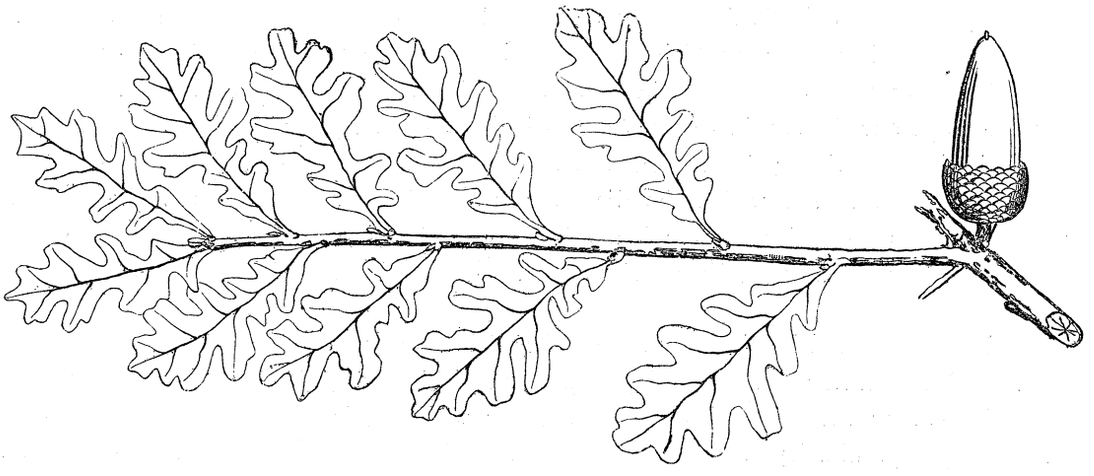

Fig. 7.

Fig. 7. Branch, leaves, and acorn of Q. Hindsii, ½ natural size.

Description.—A very large tree, allied to *Q. alba* of the eastern States; bark thick and rough; leaves deeply and unequally lobed; lobes numerous, rounded, obtuse; young leaves pubescent

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on both sides; upper surface of older leaves smooth, pale green; lower surface pubescent, especially along the veins. Fruit sessile, generally solitary; cup hemispheric, thick, covered with thick tumid scales which give it a turberculated appearance; gland long-ovoid or conical, 2 inches long by $\frac{5}{8}$ inch wide; testa thin, mahogany color; nucleus not unpalatable.

This is the finest oak of California, and perhaps the most abundant. Its favorite habitat is on the slopes of the "foot hills" and along the streams which traverse the valleys of that State. In the foot hills and minor valleys of the Coast mountains and Sierra Nevada it grows in groups or scattered as single trees over the oat-covered surface, forming the most important element in those scenes of quiet beauty which so often excite the admiration of the traveller in California.

Along the streams it forms belts of timber of varying width and density, the number and size of the trees being apparently proportioned to the size of the stream and the quantity of moisture derived from it.

On the banks of the Sacramento, in a few instances, I saw this oak when considerably crowded, assuming the form and closely copying the appearance, in all respects, of the white oak of the east; but, generally, both on the hills and on the plain, it inclines to form groups, or open groves in which the trees assume the spreading form of *Q. pedunculata* in the parks of the Old World.

I think that the finest studies of trees which I have ever seen were afforded by the groups or single trees of this oak in the Sacramento valley.

The general character of this tree is pretty well represented by the accompanying plate, but it is frequently still more spreading. The trunk is often six, seven, or even eight feet in diameter, and covered with a thick and deeply cracked but light colored bark. At the height of ten or twelve feet from the ground the trunk divides into many branches, which throw out their huge arms nearly horizontally to the distance of fifty or sixty feet on either side, the extreme branches in some cases coming quite down to the ground. Near Marysville I measured one—by no means the largest one seen—of which the trunk, three feet from the ground, was six feet in diameter; the height is estimated at seventy-five feet; the circle shaded by its branches measured one hundred and twenty-five feet in diameter.

The beauty of these oaks is frequently mentioned in my notes, from which I will make a single extract, referring to those which form the belt of timber bordering Cache creek.

"This timber belt is composed of the most magnificent oaks I have ever seen. They are not crowded as in our forests, but grow scattered about in groups or singly, with open grass-covered glades between them; the trunks, often seven feet in diameter, soon divide into branches, which spread over an area of which the diameter is considerably greater than the height of the tree. There is no under growth beneath them, and as far as the eye can reach, when standing among them, an unending series of great trunks is seen rising from the lawn-like surface."

The wood of this tree, like that of most of the diciduous trees of California, is porous and brittle; resembling in its want of tenacity that of the black oak, *Q tinctoria*, of the east. This I infer to be due to the climatal conditions under which it is found, rather than to any inherent botanical peculiarity of the tree; as from its affinity with the white oak of the eastern States, if grown in the same soil and climate the wood, in all probability, would exhibit a similar character.

The fruit, though having a noticeable resemblance in the color, thickness, and consistence of the testa of the acorn, as well as in the character of the cup, to that of the white oak, from

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its conical form and great length, is readily distinguishable from that of any other species with which I am familiar. From their abundance and edible nature they form a very important part of the subsistence of the Digger Indians, and are collected and stored up by them for winter use; piles of many bushels being frequently seen in their *rancherias*.

QUERCUS DENSIFLORA. *Hook. & Arn.* The California chestnut oak.
Q. DENSIFLORA. *Hook. & Arn. Bot. Beechey, p.* 391.
Q. ECHINACEA. *Hook. & Arn. Bot. Whipple's Rep., p.* 137.

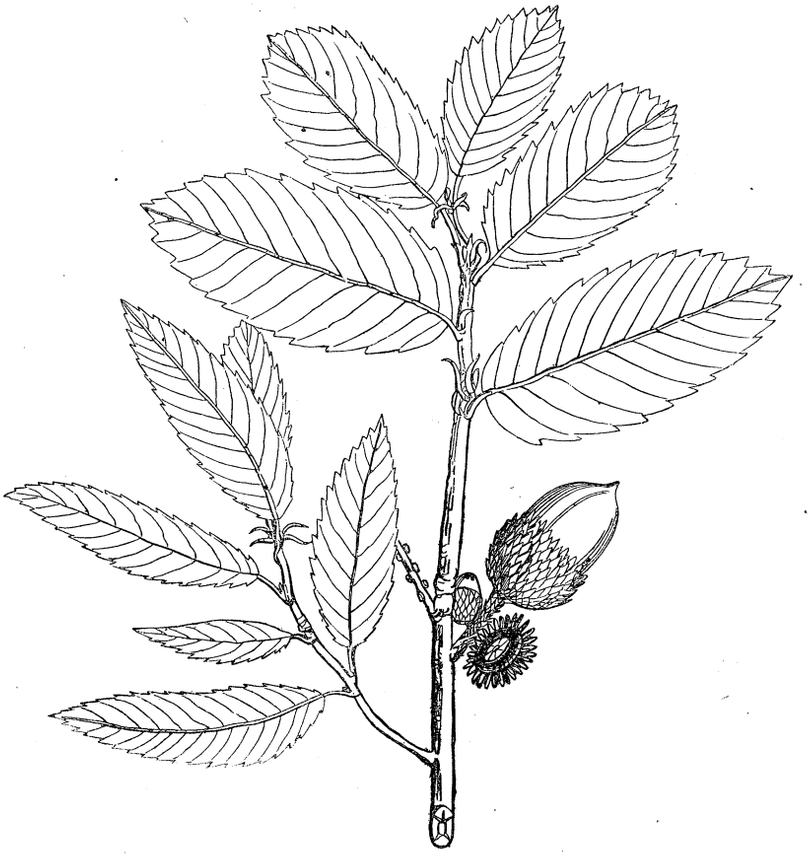

Fig. 8.

Fig. 8. Branch with leaves and fruit of *Q. densiflora*, half natural size.

Description.—An evergreen tree of small size; leaves lanceolate, oblong; smooth or dentate-serrate; the younger ones tomentose beneath, becoming smooth. Male flowers in elongated, densely flowered aments; fruit sessile, generally clustered; cup densely covered with spreading or recurved elongated scales; acorn ovoid, sub-trigonal acute, $1\frac{1}{4}$ inch long, $\frac{3}{4}$ inch broad; acute, testa very woody and hard, of a light yellowish-brown color.

I have been quite unable to distinguish between *Q. densiflora*, described by Hooker and Arnott, (l. c.,) and *Q. echinacea* of Dr. Torrey. There is a perfect correspondence in their descriptions, and my specimens agree with both except in the minor characters specified in the description given.

The resemblance to a *castanea* which this oak exhibits is, as mentioned by Hook. & Arn., very striking. The leaf is very like that of a chestnut, and the male aments, at the base of which a cluster of acorns grow, the bristling spines of the capsules and the sub-trigonal hard shelled acorn, closely resemble the flowers and fruit of *Castanea chrysophylla*, the chinquapin of

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the west. We did not find this oak north of the Sacramento valley, and its range is probably rather south than north of San Francisco. On the foot hills of the Sierra Nevada bordering the Sacramento valley it forms a low but handsome tree. Of the character and value of the wood I had no opportunity of judging.

The figure given is copied from a drawing made by Dr. Kellogg, of San Francisco, and represents the variety of foliage which most resembles that of the chestnut. An equally common form has nearly entire leaves, of smaller size, approaching more closely those of the chinquapin.

QUERCUS AGRIFOLIA, *Nee.* The evergreen oak.
Q. AGRIFOLIA, *Nee. Ann. Sc. Nat.* 3, *p.* 271.
Q. AGRIFOLIA, *Nutt. Sylva.* 1, *p.* 5, *t.* 2.
Q. OXYADENIA, *Torr. in Sitgreaves' Rep.*, *t.* 172.

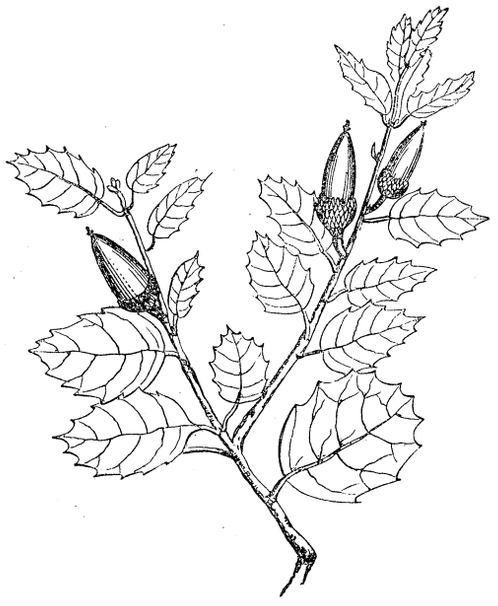

Fig. 9.

Fig. 9. A branch of *Q. agrifolia*, with leaves and fruit, half natural size.

Description.—A low spreading tree; leaves evergreen, ovate or rounded, remotely spinosely, dentate or entire, smooth above and below; acorn elongated, conical, acute; cup hemispheric or conical; scales small, appressed, oblong, obtuse, smooth.

This tree is everywhere known in California as the "scrub," or evergreen oak, although there are several others which are more shrub-like, and of which the leaves are persistent. It usually forms a low spreading tree, which resembles in size and form the apple tree of the orchards of the eastern States, the trunk being rarely more than a foot in diameter, or the altitude more than 30–40 feet. I noticed much diversity in the form of the leaves, as they were sometimes, nearly orbicular, and at others much elongated, and both toothed and entire. The leaves of the same tree, also, frequently exhibit considerable variety of form; they are always small, however, and have smooth surfaces above and below.

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Like most of the evergreen oaks, *Q. agrifolia* is rather a southern tree. Though found in all parts of the Sacramento valley, it scarcely extends further northward than Fort Reading, while it ranges southward into Mexico.

The wood is hard and brittle, and, from the small size of the tree, is of little value for building purposes.

PLATANUS RACEMOSA. (Plate II.) The Mexican sycamore.
P. RACEMOSA, *Nutt. Sylva.* 1, *p.* 47, *t.* 15.
P. RACEMOSA, *Aud. Birds Amer. t.* 362.
P. MEXICANA, *Moric. Pl. Nov. ou. rar. d'Amer. t.* 26.

Fig. 10.

Fig. 10. Leaf and fruit of *P. racemosa*, one-half natural size.

The Mexican sycamore exhibits a striking general resemblance to *P. occidentalis* of the eastern States, and by a casual observer would be considered the same. It grows along river banks in the same way, and, like *P. occidentalis*, often divides into several trunks—branches they can hardly be called—which diverge widely and irregularly, giving to the tree a straggling and irregular growth. The general effect of the foliage is similar, and the trunk is covered with a white exfoliating bark. On closer examination, however, it will be seen that the resemblance to the eastern tree is only general, and the points of difference are so numerous and appreciable that the two species which they constitute need never be confounded.

The port, both in form and dimensions, of the sycamore of California is so like that of the east as to afford no diagnostic characters.

Along the rivers its growth is usually open and unsymmetrical, as has been mentioned; but

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where, as sometimes found, it grows on open and higher ground, it adopts the general habit of the trees of the country, and spreads out into a wide and tolerably compact head. The tree of which the portrait is given (Pl. II) is of this character; it is growing on the banks of Feather river, a few miles above its mouth, and situated on the alluvial bottom but some 40 feet above the stream, and a little separated from the belt of timber—principally sycamores—which line its banks. This tree had a diameter of trunk of over 6 feet, an altitude of about 100 feet, and a spread of branches nearly equal to its height, constituting one of the noblest specimens of vegetation I have ever seen.

The leaf of the Mexican sycamore, in form, color and texture, is considerably different from that of its eastern representative. It is deeply cut, as represented in the figure, and is darker green and smoother than that of *P. occidentalis*. The fruit is also in racemes of three to six, instead of being solitary, as in that species.

The bark is whiter than I have ever seen it in *P. occidentalis*, being sometimes as white as milk on all parts of the trunk and branches. The dark, polished, and digitate leaves contrast finely with the white bark, and give to the tree a much more tropical look than that of our species.

The figure given by Nuttall (l. c.) represents the leaf as pubescent or tomentose. I think that is never its character, except when very young; at least in different parts of California where I saw the tree the foliage constantly exhibited the characters which I have described.

The Mexican sycamore is apparently more southern in its habit than most of the trees with which it is associated in California, the centre of its range being, probably, about the southern line of that State. We found it bordering the Sacramento river and its tributaries in all parts of the Sacramento valley, but did not meet with it further north.

The wood of the sycamore of the west, like that of the common species and that of most of the decotyledonous trees with which it is associated, is very brittle. Of its want of tenacity, we had a striking illustration when encamped under the tree represented on the plate.

Our beds were spread on the ground under its branches, nearly touching each other. During the evening—a fresh breeze blowing, but not a high wind—we were warned by a cracking overhead that danger was impending, and had just time to "stand from under," when a branch about eight inches in diameter came crashing down directly where we had been lying.

PINUS CONTORTA. (Plate V.) The twisted pine.
P. CONTORTA. *Dougl. in Lond. Encycl. of Trees, p.* 975, *fig.* 915.
P. CONTORTA. *Loud. Arboret,* 4, *p.* 2292, *figs.* 2210 *and* 2211.
P. INOPS, (*P. distorta, Dougl.*) *Hook. Flor. Bor.-Amer.* 2, *p.* 161.

Description.—A tree of moderate or small size, of a conical, and frequently very strict figure; branches numerous, small; leaves in twos, short, yellow-green in color; cone generally ovoid acute, sometimes spherical, three-quarters of an inch to one and a quarter inch in length, persistent for several years; scales bearing short and acute spines; seeds roundish, dark; scale elongated entire.

We first met with this pine on the banks of Canoe creek, a tributary of Pit river, in northern California. After leaving that locality we saw no more of it till we reached the banks of Klamath river above Upper Klamath lake. Here it was abundant, and continued common to the Columbia.

On Canoe creek it grows in the natural meadows bordering the stream, forming a moderately

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sized tree, the largest having an altitude of 50 or 60 feet, and a diameter of trunk of 12 inches three feet from the ground. The form of the tree is erect and strict; the foliage yellow green, moderately dense; leaves in twos, two inches long, and covering all the smaller branches; the cones 1½ inches long, narrow ovoid; scales bearing short sharp spires, which are obsolete at the base of the cone. The old cones are persistent, sometimes loading the branches and giving a peculiar appearance to the tree. On Klamath river are many scattered trees having the same character and station as those on Canoe creek, but by far the greater number are gathered into the low grounds near the stream, where they form dense thickets or pine swamps of trees, generally 25 to 40 feet high and 6 to 10 inches diameter, so closely set as seriously to obstruct our passage through them.

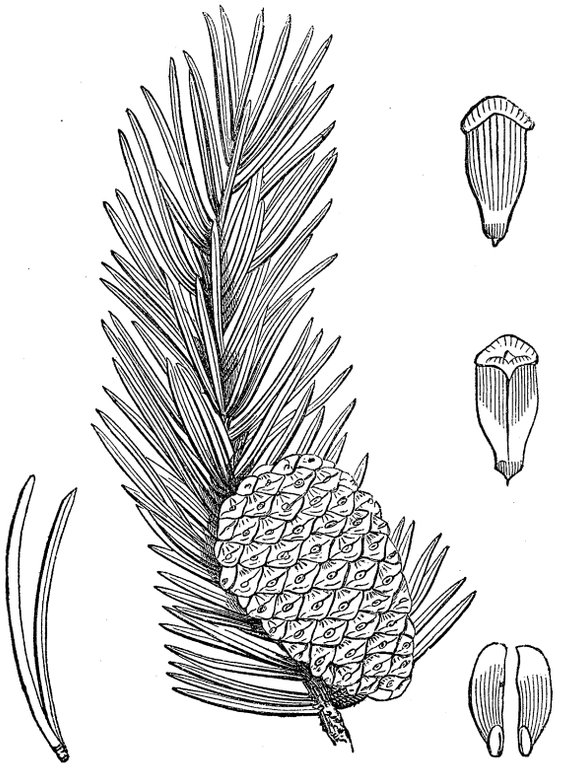

Fig. 11.

Fig. 11. Cone, leaves, scales, and seeds of *P.* , natural size.

On the lowlands bordering the western shore of Upper Klamath lake, this pine exclusively composes the forest which formed the wall-like limit of the level and grass covered prairies which spread many miles back from the water's edge, the highland more remote being covered with the much larger trees of *P. ponderosa*.

The pumice plain lying between the Klamath lakes and the Des Chutes river, the driest and most barren region which we crossed, is sparsely covered with the western cedar (*J. occidentalis*) and *P. contorta*, here lower and more spreading, its lower branches resting on the ground. Of these trees many were dead, though standing, and all then exhibited very strikingly a character which may have suggested the name "*contorta*" to Douglas, but which is common to many conifers, though perhaps nowhere so conspicuous as in this tree, viz: the curving downward and inward of the dead branches, reversing the natural upward curve of their extremities while living.

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In the Cascade mountains *P. contorta* forms a large part of the forests in the lower valleys, where it is sometimes seen nearly as closely set and as slender as canes in a cane-brake. It is common on the lower slopes and rises, scattered and dwarfed, to about the altitude of 6,000 feet; but its favorite station is evidently the moist valleys and plains.

This tree approaches *P. inops* so closely that it is perhaps doubtful if it should be separated from it. The cones and foliage are, to my eye, undistinguishable, and the cones are similarly persistent. The habit of the western tree is, however, somewhat unlike that of its eastern representative. It is never so spreading, and in some of the localities I have mentioned is more slender than any other pine with which I am acquainted.

PINUS PONDEROSA. (Plate IV.) The western yellow pine.
P. PONDEROSA, *Dougl. Loud. Arboret, p.* 2243, *figs.* 2133 *and* 2134.
P. BRACHYPTERA, *Engel. Bot. Wislz. Exp., p.* 5.
P. ENGELMANNI *Torrey. Bot. Whipple's Rep., p.* 141.
P. BEARDSLEYI, *Murray. Edenb. New Philos. Jour.*, 1855, *p.* 286.
P. BENTHAMIANA, *Hartweg. Jour. Hort. Soc. Lond.*, 4, *fig.* 213.

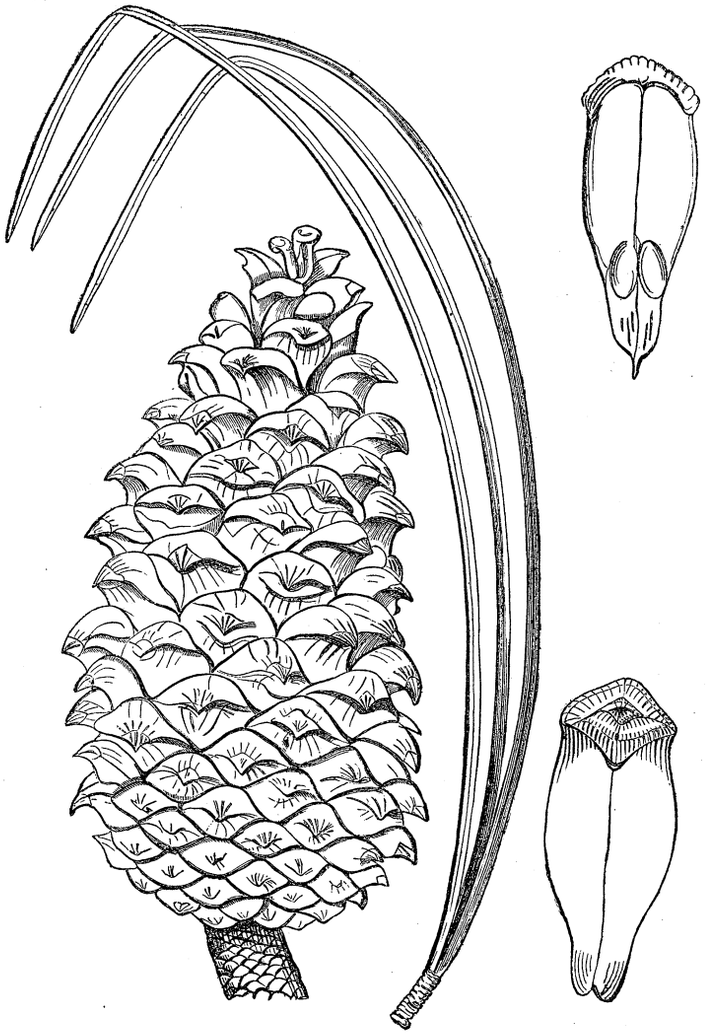

Fig. 12.

Fig. 12. Cone, scales and leaves of *P. Ponderosa*, natural size.

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This is the most widely distributed of all the pines which are found in California or Oregon; and over very large areas it is not only the most common but the only species. I can only explain the confusion which exists in reference to it in the notes on the botany of the far west which have been published, by the supposition that its favorite habitat, though immensely extended, lying so far inland, has scarcely been entered by the botanists who have visited the inhabited portions of California or Oregon.

The range of this tree is from the mountains of New Mexico, (San Francisco, &c.,) northward to and beyond the Columbia, and from the coast in California, where it is comparatively rare to the Rocky mountain chain on the east.

In the Sacramento and Willamette valleys I did not see it; but in the Sierra Nevada it is abundant, associated with *P. Lambertiana*, *Abies grandis*, *Libocedrus decurrens*, on the slopes; in many places exclusively composing the forests of the higher portions of the range, descending to mingle with the species I have named both to the east and west.

As we passed northeastwardly from Fort Reading, California, across a portion of the Sierra Nevada, at the foot of Lassen's butte, we found this species, known there as the "yellow pine," as we ascended, succeeding to *P. Sabiniana*, (which grows near the banks of the Sacramento and on the lower hills,) composing the first pine forests we saw in the country. At McCumber's it forms an important element in the magnificent forest of that region, of which I have already spoken; and still higher on the flanks of Lassen's butte it composes the entire forest, rising nearly to the line of perpetual snow. As we descended into Pit river and Klamath basins we found it still abundant, forming by far the most constant feature in the vegetation of our route from Pit river to the Columbia. Near or distant, trees of this kind were always in sight; and in the arid and really desert regions of the interior basin we made whole days' marches in forests of yellow pine, of which the absolute monotony was unbroken either by other forms of vegetation, or the stillness by the flutter of a bird, or the hum of an insect. The volcanic soil, as light and dry as ashes, into which the feet of our horses sank to the fetlock, produces almost nothing but an apparently unending succession of large trees of *P. ponderosa*.

The yellow pine, as it grows in these sterile regions, is a noble tree; and though never rivalling the gigantic sugar pine in its dimensions, it claims among western pines the second place. At McCumber's we saw many of this species six, and even seven, feet in diameter, three feet from the ground; and near the base of Mount Jefferson, in Oregon, I saw one which was twenty-five feet in circumference at the same height.

The port of *P. ponderosa* is somewhat more spreading than *P. Lambertiana*, though far less so than *P. Sabiniana*. Where these last two species grow together, the contrast in form is very striking, as is also the color and character of the foliage.

The leaves of *P. ponderosa* are in threes, from four to ten inches in length, serrated on their edges, and, being confined to the extremities of the branches, from which they radiate in all directions, give the foliage a peculiarly tufted appearance. The color of the leaves is a dark yellow green, and readily distinguishable from the *deep* blue green of *P. Lambertiana*, or the *light* blue green, or glaucous hue, of *P. Sabiniana*. The successive appearance and decadence of clusters of leaves at the end of the branches gives to the smaller ones a beaded character, which distinguishes it from all other western pines. The smaller branches, and especially the central shoot in young trees, are strongly marked with the scales of the fallen leaves; closely resembling in some cases the leaf scars of the lepidodendroid fossils of the coal period.

The cones of *P. ponderosa* are from three to six inches in length, ovoid in form, the bosses of

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the scales bearing small acute recurved spines. The cones grow singly or in clusters of from two to four, generally at the extremities of the smaller branches, and are not pendent, as in the group of pines to which *P. Lambertiana* and *P. strobus* belong. The seeds are somewhat larger than apple seeds, and form the principal subsistence of several kinds of birds.

The average length of the cones of *P. ponderosa* is perhaps four inches, though in the same grove of trees I have seen all the variations I have mentioned. On the flanks of Lassen's butte we found a pine prevailing over an area of several square miles, differing in nothing, as I could perceive, from the common *P. ponderosa*, except that the cones were all double the average size; I could not doubt, however, that it was a mere variety of the common species.

The bark of *P. ponderosa* affords one of its most noticeable and distinctive characters. It is light yellowish brown, (cork color,) and is divided into large plates, four, six, or eight inches in breadth, which are flat and smooth, and enable one to distinguish the trunk of this tree at a considerable distance. These plates of cork-like bark are made the repositories of acorns by the woodpeckers, and it is a very common thing to see large numbers of these trees having the bark of the trunk cut into a honeycomb by thickly set holes as large as thimbles, or as thickly studded with inserted acorns.

The wood of the yellow pine is generally highly resinous, and, though heavy, is brittle and less valuable than that of the sugar pine. Like the "pitch pine" of the eastern States, it is, however, sometimes of excellent quality, containing little resin, soft and tough. The yellow pine exhibits a tendency to twist, which is very noticeable in a forest of these trees, the grain of trunk and branches being often seen coiled into the closest possible spiral.

This is undoubtedly the tree described by my friend Dr. Engelmann under the name of *P. brachyptera*, the specimens on which his description was based having the wings of the seeds unusually shortened. In the normal form the seed-wings are not shorter than in other pines having cones of equal size.

Although I have taken Douglas' name, which was the first applied to this tree in the far west, I have been inclined to doubt whether it should not be considered a mere variety of *P. rigida*. I have not been able to find any constant differences between the fruit or foliage of the two species. The western tree is, however, much more robust, growing taller and larger, the bark smoother, and the wood generally less resinous.

The same differences are also noticeable between *Abies Canadensis* of the west and east, and may very well depend on a soil and climate which is particularly favorable to the growth of coniferous trees.

The various phases exhibited by *P. rigida*, going from New England to Georgia, show the influence of soil and climate in modifying its habit. It should also be observed that its range is very great in the eastern States, and that it extends from Louisiana westward nearly to New Mexico, where *P. ponderosa* occurs—a fact which strengthens the probability that they are identical, and that, as a single species, this tree bridges over the continent south of the central desert, in the same way that *Abies Canadensis* stretches across from Lake Superior to Oregon, north of that area.

I have before me, as I write, specimens of the cones and foliage of *P. ponderosa* from the immediate vicinity, and perhaps from the very trees, where Douglas obtained the cone and leaves which he sent to Europe; and on the Columbia I observed the tree where I know he had botanized. There is, therefore, no possibility of being in error as to the tree which he designated by the name of *P. ponderosa*. The cone sent home by Douglas was immature and deformed,

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and no pine at the west bears cones of this character, unless, as in that unfortunate case, as a monstrosity.

The pine described by Mr. Murray under the name of *P. Beardsleyi* is evidently one of the most common forms of *P. ponderosa*. The differences which he suggests are such as are often exhibited by the trees of the same grove. The leaves are long or short, the cones large or small, the wood hard and resinous, or soft, according to the soil in which it grows.

PINUS SABINIANA. Sabine's pine—nut pine.
P. SABINIANA, *Dougl. in Comp. to Bot. Mag.* 11. *p.* 150.
P. SABINIANA, *Lambert, Pinus, Ed.* 2*d*, 2, *p.* 146, *t.* 80.
P. SABINIANA, *Hook, Flor. Bor. Amer.* 2, *p.* 162.
P. SABINIANA, *Nutt. Sylva.* 3, *p.* 110, *t.* 702.

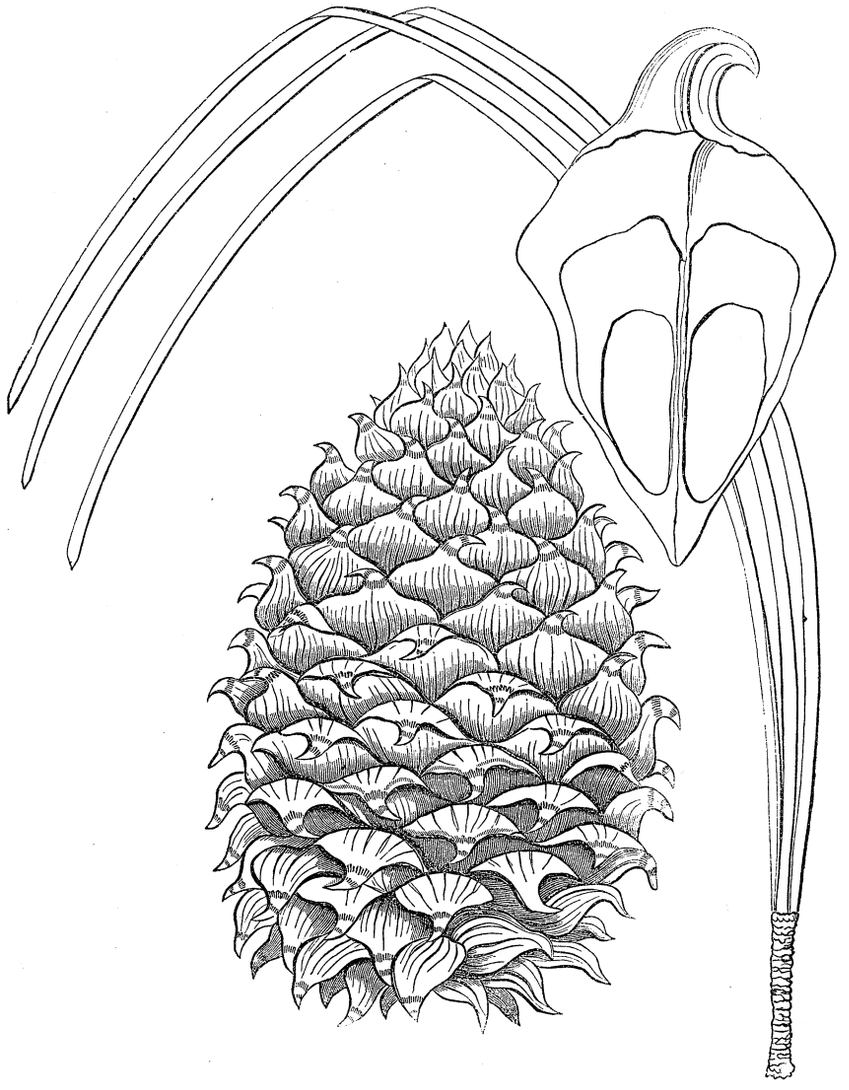

Fig. 13.

Fig. 13. Cone of *P. Sabiniana*, $\frac{1}{3}$ natural size.
Fig. 13*a*, *b*. Leaves and seed of *P. Sabiniana*, natural size.

The "nut pine," as this tree is commonly called in California, is scarcely less interesting

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or important, in a scientific or economical point of view, than the great Lambert pine. It does not rival that species in the immensity of its size, nor in its value for timber, but the form of the tree is peculiar, and quite unlike that of any other western pine which we saw, and the cones are considerably larger and more ponderous than that of any other species; and, what is of more importance to the Indians, they contain such stores of eatable nuts as to become a staple article of subsistence in many extensive districts.

The "nut pine," or, as it is sometimes called from the toughness of the wood, the "wythe pine," nowhere forms forests, but is disseminated very generally over California. It was found by our party in the valleys of the coast ranges, as far north as Fort Lane, in Oregon, though in the interior it does not occur on our route between Pit river and the Columbia. It chooses, in preference, regions unoccupied by other trees, and is generally found scattered sparsely over rough and rocky surfaces, where almost no other plant would take root.

Douglas, and, copying him, Nuttall, give to this tree almost an alpine station, which does not at all accord with my observations. This was the first pine I saw in California, and we found it growing in Napa, Sonoma, and other valleys of the coast range, and on the borders and at the head of the Sacramento valley, but little above the level of tide water. Subsequently we met with it at various points in northern California, but never at any considerable altitude.

On our route it occurred most abundantly in the *pedregal* country bordering Pit river, where that stream forces its way through the spur of the Sierra Nevada into the Sacramento valley; a region which rivals, in the magnitude of its volcanic phenomena, the islands of Haiwaii or Sicily. It is covered with piled up masses or congealed floods of lava, which, rough, ragged, and bare, seem to bid defiance alike to the approaches of animal or vegetable life. Only here and there, in the crevices or hollows of the rocks, narrow and shallow accumulations of sterile soil had taken place, which sustained scarce any vegetable growth, except thickets of the evergreen *manzanita* and scattering trees of the nut pine; both, however, doing their utmost to redeem the district from its hopeless sterility, by producing their berries and nuts in such profusion as to attract and feed large numbers of birds, bears, and Digger Indians.

Nuttall unaccountably failed to see the nut pine in California, and, therefore, repeats without comment Douglas' description of it. This is to be regretted, for Nuttall's discriminating eye would at once have detected the discrepancies which exist between the tree as it grows and the published description of it.

After speaking of its alpine habit, which our observations disprove, and of its range northward to the Blue mountains, on the upper Columbia, in which he was guided only by the nuts collected by the Indians, and probably misled by referring the nuts of the nut pine of that region to this tree, Douglas says: "The stems of these pines are of a very regular form, and grow straight and tapering to the height of 40 to 140 feet, and are from three to twelve feet in circumference, and, when standing apart, clothed with branches down to the ground."

An extract from my notes, with the accompanying sketch, (fig. 13,) taken when surrounded by these trees, will show what is the sort of *P. sabiniana* in all parts of California where we saw it.

"*July* 28.—To day saw great numbers of the nut pine, sometimes in groves and clusters, more generally as single trees, scattered about among the rocks. The form of the tree, as well as its foliage, are peculiar, and readily serve to distinguish it from all other pines I have seen. It has nothing of the conical figure of most coniferous trees, but the trunk soon divides into spreading branches, and the tree has the port of an oak or maple, sometimes even approaching

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the form of the Italian stone pine. The foliage is pale bluish-green and thin, and the whole aspect of the tree light and airy.

"The cones are usually solitary, ovoid in form, sometimes as large as one's head, and very ponderous, they are covered with spurs, or strong curved spires, an inch or more in length, of which the broad bases cover all the exposed portion of the scales. The seeds are as large as large beans and very palatable, having, however, a slightly terebinthine taste."

This description, which subsequent observations fully confirmed, included nearly everything necessary to be said of the tree. It will be noticed that it differs in several respects from that given by Douglas, so much so that if there were any other tree in California to which his description could better apply, I should be inclined to consider the common "nut pine" as distinct from his *P. sabiniana.*

He represents the form of the tree as conical, the cones, much as I have described them, but in verticils of three to nine. The leaves eleven to fourteen inches in length in threes, sometimes four in a sheath; while in those I saw, the form was diffuse, the cones solitary, the leaves eight to ten inches long, always in threes. The description of *P. coulteri*, given by Don in *Lin. Trans., vol.* 17, *page* 440, in some respects agrees better with that of the California nut pine than does Douglas' description just cited. This tree (*P. coulteri*) he describes as having "an altitude of eighty to one hundred feet, with large *permanently spreading branches*—ternate leaves larger and broader than those of any other known species—and of a glaucous hue. Cones oblong, solitary, very large—twelve inches in length by six in diameter—comparable to sugar loaves, the spirous processes of the scales three to four inches in length, as thick as one's finger, seed as large as an almond, eatable."

Without authenticated specimens for comparison, I would not presume to decide on the identity or difference of *P. coulteri* and *P. sabiniana;* still from the description of *P. coulteri*, I should infer that this was only an unusually large and strong form of the nut pine of northern California, and notwithstanding the discrepancies of description. Authenticated specimens of *P. sabiniana* which I have seen, being undistinguishable, to my eye, from those I brought from California, it would seem probable that the "nut pine," of northern California, is the *P. sabiniana* of Douglas and *P. coulteri* of Don. If so, Douglas' name must take precedence, as it was first bestowed. It is, perhaps, necessary to say in this connexion that there are so many "nut pines" in the far west, that without discrimination the use of the term will beget confusion. Aside from the three leaved species, of which I have spoken, there are in New Mexico the *piñon* of the Mexicans—*P. edulis* of Englemann—which is two leaved; in the Rocky mountains and Cascade range, *P. monophyllus*, Torry and Frémont, which is one leaved; and *P. flexilis*, Torry and James, which are five leaved, all of which produce seeds as large and palatable as those of *P. Cembra* of Europe.

The timber furnished by *P. sabiniana* is of little value. It is not wanting in tenacity, but its spreading form reduces the dimensions and value of the trunk, and the wood is resinous and the grain irregular.

As an ornament to cultivated grounds it is well worth attention. The form and foliage of the tree are pleasing, and the huge and bristling cones filled with eatable nuts are among the most curious and interesting forms of vegetable fructification, and would not inappropriately find a place among the ornaments and delicacies of the table. When we think that thousands of beings, red skinned but human, look to these pine trees for their winter store of food—after

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grasshoppers, their most esteemed aliment—we shall cease to regard the cultivation of pine trees for their fruit an absurdity.

PINUS LAMBERTIANA. The sugar pine.
P. LAMBERTIANA, *Dougl. in Linn. Trans.* 15, *p.* 500.
P. LAMBERTIANA, *Dougl. Lamb. Pinus, Ed.* 2, 1, *p.* 57, *t.* 34.
P. LAMBERTIANA, *Endl. Syn. Conif. p.* 150.
P. LAMBERTIANA, *Loud. Arboret* 4, *p.* 2288, *figs.* 2203–2207.
P. LAMBERTIANA, *Nutt. Sylva* 3, *p.* 122, *t.* 14.

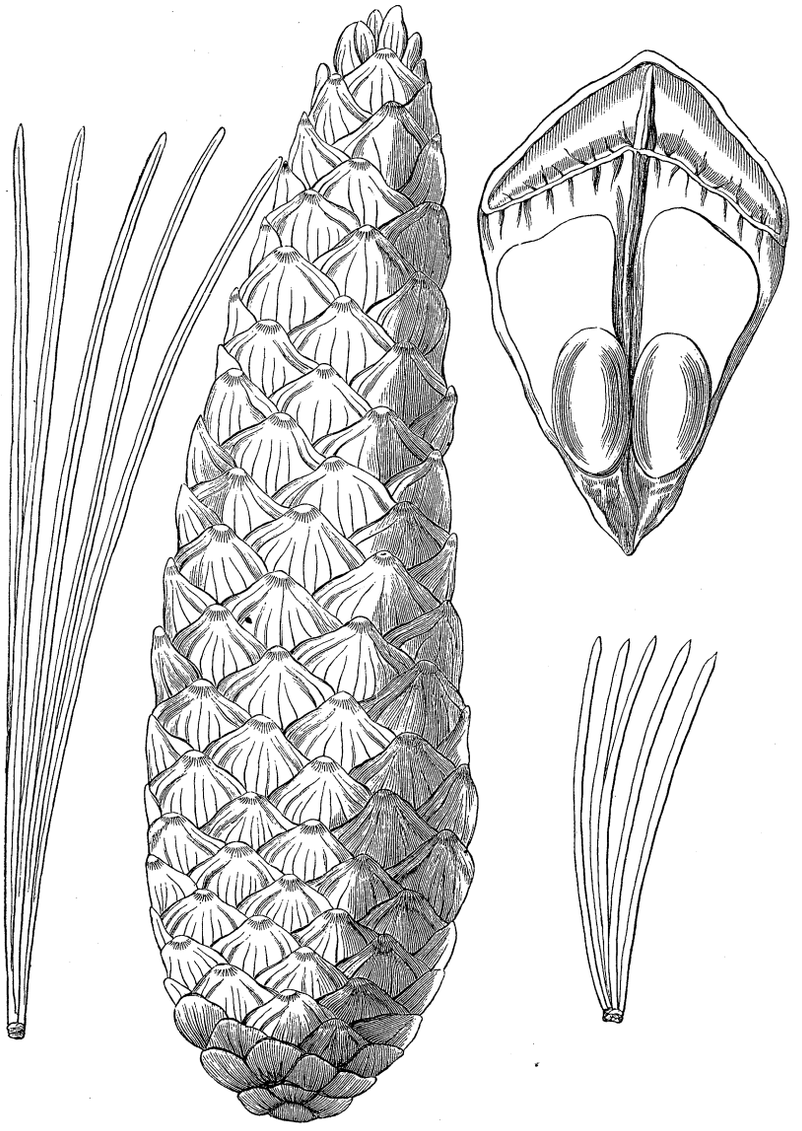

Fig. 14.

Fig. 14. Cone of *P. Lambertiana*, ½ natural size.
Fig. 14*a*, *b*. Leaves, scale, and seeds of do., natural size.
Fig. 14*c*. Short leaves of do., natural size.

This pine, undoubtedly the most magnificent species of the genus to which it belongs, is widely distributed over the country lying between the Rocky mountains and the Pacific, and is there universally known as the sugar pine. Its range extends from the Mexican line on the

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south to the vicinity of the Columbia river. It is disseminated through nearly all parts of the Sierra Nevada within their limits, and is not rare in the coast ranges between San Francisco and the Umpqua river. It is also generally spread over the transverse ranges of mountains—Siskiyou, Umpqua, and Calapooya—which connect the Cascades and coast ranges; and probably the finest trees of it which exist are in the vicinity of Humboldt bay and Rogue river, on the coast.

I have never seen it anywhere existing in such numbers as of itself to form forests, but generally occurring associated with other species which far surpass the sugar pines in numbers, while they, in turn, exceed all their fellows in dimensions. Scattered here and there through the forest, they seem, in their towering grandeur, like so many chiefs surrounded by their subjects and slaves.

The sugar pine is closely allied, in all its botanical characters, to the white pine (*P. strobus*) of the eastern States; though like all the conifers of the Pacific coast, it exhibits a symmetry and perfection of figure, a healthfulness and vigor of growth, such as are perhaps not attained by the trees of any other part of the world.

The young trees of the sugar pine give early promise of the majesty to which they subsequently attain. They are unmistakably young giants, even when having a trunk with a diameter of a foot or more; their remote and regularly whorled branches, like the stem, covered with smooth grayish-green bark, showing that, although so large, the plant is still "in the milk," and has only began its life of many centuries.

The mature tree is one of the most magnificent exhibitions of vegetable life that nature has produced; rising sometimes to an altitude of 300, and having a diameter of 20 feet, it is scarcely inferior to the *Sequoias*, the confessed monarch of the vegetable kingdom. It should be said, however, that it rarely attains such extreme dimensions. Where abundant, and the general growth vigorous, it is rare to find a tree more than 10 feet in diameter, and 200 feet in height. The sugar pine conspicuously exhibits one of the most general and striking characters of the *Coniferæ*—the great development of the trunk at the expense of the branches. Nearly the whole growth of the root is thrown into the trunk, which generally stands without flaw or flexure, a perpendicular cone, all its transverse sections accurately circular; sparsely set with branches, which in their insignificance seem like the festoons of ivy which wreath the columns of some ancient ruin.

The foliage is less dense than that of many pines, the leaves in fives, 3 inches in length, and of a dark blue green color. As in *P. strobus*, toward the summit of the tree a few of the branches are frequently longer than those below, and suspended from the extremities of these, singly or in clusters, hang the cones. These are of a size commensurate with that of the tree, being sometimes 16 and even 18 inches in length by 4 inches diameter. More commonly they are 12 to 14 inches in length by 3 inches in diameter. They bear a general resemblance to the cones of the white pine, still more to those of *P. excelsa* from the Himalayas. They are generally slightly curved, and are composed of densely imbricated thin scales, of which the exposed portion is rounded in outline and without spines. They are commonly less resinous than those of *P. strobus*. The wood of the sugar pine is very similar in character to that of the white pine; white, soft, homogeneous, and usually straight grained. It is the most highly esteemed for inside work, of all the varieties of lumber found in California.

At McCumber's and Shingletown, in northern California, the saw-mills are set in what must be a lumberman's paradise—a forest composed of trees of remarkable size, perfection, and

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uniformity; sugar and yellow pine, with the western balsam fir, and *Libocedrus*, of which the eye may take in at a glance even hundreds which reach or exceed the utmost capacity of the mills, and many which would furnish sticks a yard square and a hundred feet long, as straight as an arrow, and almost without a knot.

The resin of the sugar pine is less abundant than that of the *P. ponderosa*, is white or transparent like that of *P. strobus*. That which exudes from partially burnt trees, for the most part, loses its terebinthine taste and smell, and acquires a sweetness nearly equal to that of sugar. This sugar gives the tree its name, and is sometimes used for sweetening food. It has, however, decided cathartic properties, and is oftener used by the frontier men as a medicine than a condiment. Its resemblance in taste, appearance, and properties to *manna*, strikes one instantly; and but for a slight terebinthine flavor, it might be substituted for that drug, without the knowledge of the druggist or physician, its physical and medical properties are so very like.

PINUS CEMBROIDES. The American Cembra pine.
P. CEMBROIDES, *Zucc. Jour. Hort. Soc.* 1, *p.* 236.

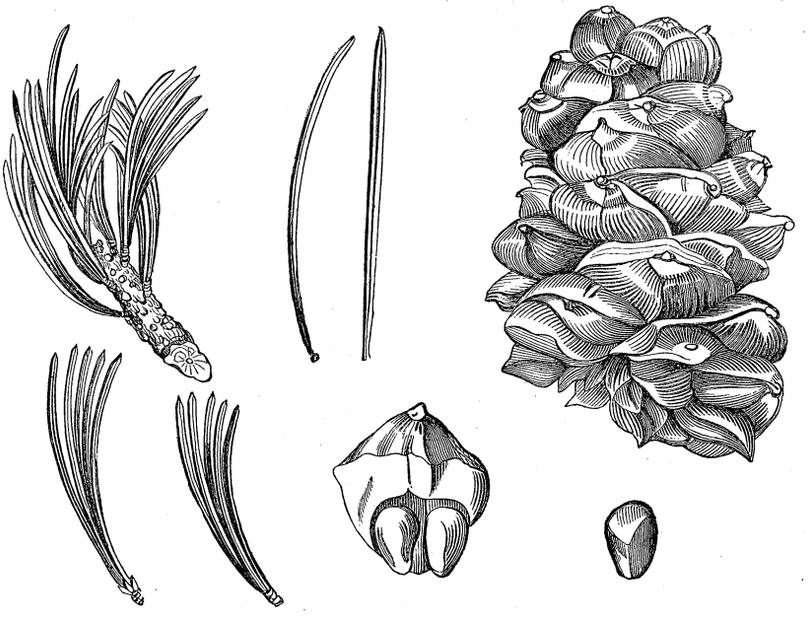

Fig. 15.

Fig. 15. Cone, leaves, scale, and seed of *P. Cembroides*, natural size.

While exploring the passes of the Cascade mountains, about latitude 44° north, we first met with this tree.

We crossed the mountains several times at an altitude of about 7,000 feet, the line of perpetual snow. After reaching an altitude of 5,500 feet, among the firs and spruces which cover the mountain sides began to appear pines of a species then quite new to me. As we ascended we left behind us Menzies' and Douglas' spruces, (*A. Menziesii* and *A. Douglasii*,) the western balsam and silver firs, (*P. grandis* and *P. amabilis*,) which grow so luxuriantly below, and, at the height of 6,500 feet, found the scattered clusters of trees to be composed of nearly equal numbers of the pine to which I have alluded, and of a beautiful and then undescribed spruce, which I have since called *Abies Williamsonii*. Still higher, at the extreme limit of vegetation, the bleak and barren surfaces were held by this pine in a possession undisputed by other trees, but opposed by the rigors of a climate which had bowed it to the ground, forcing it to grow in

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thick and tangled masses, scarcely rising above the surface; the trunks, sometimes of considerable size, creeping about among the rocks like roots.

This pine nowhere, within my observation, attained the size of a large tree; the largest individuals, with a diameter of two and a half feet, having no greater height than 50 feet. The bark of the trunk is white as milk, but moderately rough and thin, having much the appearance of the bark of the white oak (*Q. Alba*) in trees of moderate size; the bark of the branches gray, smooth, and tender, as in the white pine; the wood of the branches very flexible and tough, the leaves confined to the extremities of the branches, five in a sheath, light, blue-green, triangular, and smooth; those of each fascicle of uniform length and approximated, giving the foliage a peculiar, notched, or cropped look. The cones were so rare, that, though constantly among the trees and on the lookout myself, I had for two weeks an offer, open to all our party, of a dollar for a good cone; and no one was able to claim the reward. Fragments of cones, recent or of other years, were under every tree, but (containing seeds with kernels nearly as large as peas) they had been most carefully sought and torn up by the little pine squirrels. At the end of the two weeks' search, a smile of fortune led me to a locality where that want was fully supplied. The cones are erect or divergent, two to three inches long, ovoid in outline, oblique at the base, of a peculiar red color, very smooth and free from resin. They are composed of scales, which are thick and woody, of which the bosses project in flattened prisms, or cones of considerable length, giving an inequality of surface greater than in any of the smaller pine cones which have been described. The scales have no spines.

The seeds are wingless or nearly so; when mature, are oval in form, as large as large peas; the flavor is agreeable, and the Indians eat them whenever they can be obtained.

The description of *P. flexilis*, as given by Torrey, James, and Nuttall, agree in so many particulars with that of the summit pine of the Cascade mountains that I was at first inclined to regard them as identical. *P. flexilis*, however, where it has been observed, has not the extreme alpine habit of our trees, and the cone, as figured by Nuttall, is as different as possible from the cones which it bears. If *P. flexilis* has been accurately described, the two species, however closely allied, are distinct. The cone figured by Nuttall partakes much more of the character common to those of most of the five leaved pines, being pendulous, slender, and composed of relatively thin, appressed scales. If the cone of *P. flexilis* is of this character it may justify the comparison which he makes with that of *P. Cembra*, which, though short—sometimes almost globose—has the general features of the cones of *P. strobus*, *P. Lambertiana*, &c.; whereas the cone of *P. Cembroides?* has almost nothing in common with that of *P. Cembra* but its eatable seeds; a character which it shares with two other nut pines of the western mountains—*P. monophyllus* and *P. edulis*—the cones of which are more like those of this species than they are those of *P. Cembra*.

I have not access to the original description of *P. Cembroides*, nor are any specimens, to my knowledge, in possession of American botanists. Until a more satisfactory comparison can be made between the Oregon tree and that of Mexico it will be impossible to determine the question of their identity or difference; though it would seem improbable that a tree having the extreme alpine habit of that of the Cascade mountains should be found in any part of Mexico, they are evidently so very like each other that I have thought best for the present to consider them identical.

The description of *P. flexilis*, as given by Dr. James, (*Long's Exped., vol. 2, p.* 34,) does not agree with that given by Dr. Engelmann, (*Bot. Wisliz. Exped., p.* 5,) where it is represented

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as having "pendulous, squarrose, cylindrical cones," which, with its quinate leaves, "assimilate it to *P. strobus;*" but "the seed, large and eatable, leaves not serrulate and stouter. Dr. James, on the contrary, says his *P. flexilis* has, like *P. strobus*, leaves, 5 in a fascicle, but beyond that there is little resemblance. "The leaves are short and rigid, the sheaths short and lacerated, the *strobiles erect*, composed of large unarmed scales, being somewhat smaller than those of *P. rigida*, but similar in shape, and exuding a great quantity of resin," &c.

His description of the tree agrees well with that of the species under consideration, except that he does not mention the white bark. The flexible branches and short leaves confined to the extremities of the branches of *P. flexilis* are characters shared by most of the five-leaved pines, which form a group by themselves, and should perhaps constitute a sub-genus. The *red, oblique-based resinless* cones of our trees seem clearly to distinguish it.

The wood of *P. flexilis* is white and soft, and not highly charged with resin, resembling that of *P. strobus* and *P. Lambertiana.*

PICEA GRANDIS, *Dougl.* (Plate VI.) The western balsam fir.
P. GRANDIS, *Loudon, Arboret, p.* 2341, *figs.* 2245, 2246.
PINUS GRANDIS, *Dougl. ms.*
ABIES GRANDIS, *Lindl. Penny Cyclop. No.* 3.
A. GRANDIS, *Hook. Flor., Bor. Amer.* 2, *p.* 163.
A. GRANDIS, *Nutt. Sylva.* 3.

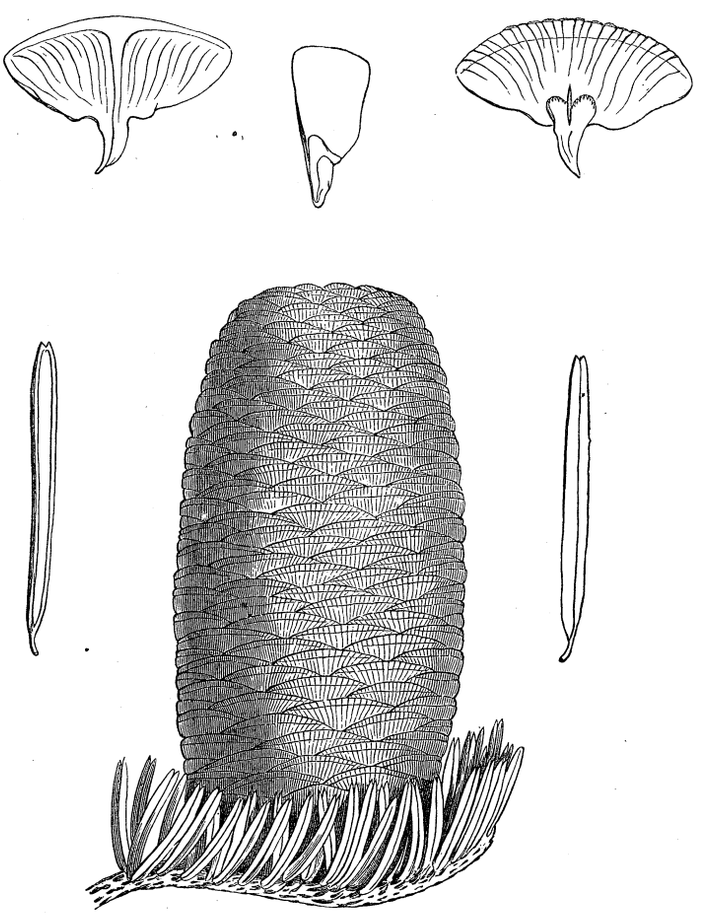

Fig. 16.

Fig. 16. Cone, leaves, scales, and seed of *P. grandis*, natural size.

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Among the many sad things connected with the death of the lamented Douglas, was the loss which botanical science suffered in being deprived of the full exposition which he would have given, had he lived, of the specimens which he collected during his residence in California and Oregon. Of the vast material which was transmitted to England through his industry, much was described by him; and his notes and descriptions have constituted a fund from which all have drawn who have had occasion to refer to the subject of the botany of the regions he visited. His descriptions were, however, generally brief, and only preparatory to a more elaborate work to be prepared by himself and others subsequent to his return. His specimens have since been carefully studied by Lindley, Hooker, Lambert, &c., and the published results, as might have been expected from the learning and ability of these botanists, have been of great scientific value, and as full and accurate as they could be in the circumstances. Nothing could compensate, however, for the want of his living testimony in reference to the thousand points of inquiry which would arise in the study of his specimens; and none but himself could correct the inevitable errors which attended the transport, the packing and unpacking, the handling and examination of his plants. Who that has the care of collections in natural history does not find it almost a daily necessity to replace labels and return erratic fragments to their connections?—to do what, if left to other hands, would be so done as to obscure if not falsify facts.

In speaking of *Pinus ponderosa*, I have alluded to the consequences of the fact that an abnormal and distorted cone was made to stand the sole and unqualified representative of one of the noblest and the most widely distributed of western pines. I think we have evidence that a somewhat similar mistake has occurred in reference to the cones of *Picea* (*Pinus*) *grandis* of Douglas.

This tree is described (Dougl. & Lamb. Comp. Bot. Mag. II, p. 147) as "a noble tree, akin to *P. balsamea*, growing from 170 to 200 feet high, with a brown bark; leaves emarginate at the apex; cones lateral, solitary, cylindrical, obtuse, very similar to those of *P. cedrus*, but larger, six inches long, of a chestnut brown color, &c., (Loudon, Arboret, p. 2341.) In the description of *P. amabilis* (Loud. op. c. p. 2342) the cones are said to resemble those described as belonging to *P. grandis*, but to be twice as large as those of *P. grandis* sent home by Douglas, and botanists have since been unable to distinguish between these two species, and generally regard them as forms of the same.

In the Cascade mountains, south of the Columbia, near where Douglas procured his specimens of *P. grandis* and *P. amabilis*, I found two firs growing which must be those designated by Douglas under these names. Of these one was indeed a noble tree which we had first met with in California, where, from its resemblance to *P. balsamea*, it has been called by the residents, and by several botanists, the balsam fir, and considered identical with the eastern species. It grows very abundantly in the Cascade mountains; up to and beyond the Columbia it rises to the height of 200 feet; has emarginate leaves; cones never more than three inches long, very obtuse, and having a depression at the summit, and resembles those of *P. cedrus* more than those of any other species. These cones are, however, always green or greenish brown, and never chestnut color; they are also comparatively free from resin.

The other tree to which I have referred is very unlike this, never attaining equal size, much more strict and conical in form where both grow in open grounds; the foliage more dense; the leaves darker above, more glaucous below, entire, and often acute; the cones double the size of those of the "balsam fir" of the same region; elliptical in form, rounded above, dark purple in color, and more resinous. The scales of the cones and bracts relatively much longer. Of

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these trees the first agrees well with the descriptions of *P. grandis*, given by Douglas and Nutall, and is the only tree which I saw in the region where Douglas obtained his specimens to which their descriptions could be applied. I have, therefore, no doubt that the western balsam fir is *P. grandis*. Of his *P. amabilis* Douglas left no description, sending home only the cones and leaves. Of these, good figures and a brief description are given by Loudon, (*Arboret*, 4, *p.* 2342.)

As will be seen from the figures now published, (fig. —,) from specimens obtained by myself, that there is an entire correspondence between Douglas' *P. amabilis* and the "silver fir" of the Cascade mountains, and I have, therefore, regarded them as identical.

The difficulty which botanists have found in distinguishing Douglas' *P. grandis* from *P. amabilis* has apparently arisen from the want of a full description of *P. amabilis*, such as Douglas alone could give. Lambert also states that the cones of *P. grandis* are $6\frac{1}{2}$ inches long by $3\frac{1}{2}$ broad, undoubtedly a mistake, as there is not a tree growing where Douglas obtained his *P. grandis* which has large unornamented cones, except *P. amabilis*. *P. nobilis* is found in the same region, but the large bract-covered cones of this species could never be confounded with either of the two species in question.

The figures of the cones of *P. grandis*, given by Loudon, (Arboret, 4, p, 2341,) are certainly considerably unlike that which I now give (fig. 16) of the cone of what I have considered as *P. grandis;* and if they are accurately copied from Douglas' specimens, and those specimens are well preserved, I should be, perhaps, inclined to believe that Douglas had found on the Columbia a fir not now known there, and that he had left unnoticed the tree which, after the Douglas spruce, is the most abundant. Every one who has attempted to preserve the perishable cones of *Picea* is aware of the great difficulty with which they are made to retain their perfect forms, and I think that the cone given by Loudon (l. c., fig. 2246) bears evidence of distortion or composition. The arrangement of the scales in vertical rows is not in accordance with *nature's* laws of phyllotaxis, at least in the pines, spruces, or firs; and the *descriptions* of the cones of *P. grandis*, given by Loudon (l. c.) and Lindley, (*Penny Cyclop. Abies*,) agree perfectly with my specimens and the figure now given, which was made not alone from preserved specimens but from drawings made in the field.

The leaves figured by Loudon are represented as acute, while they are described to be obtuse or emarginate. The seed and scale, also, as he gives them, are larger than would ever be found in a cone but $3\frac{1}{2}$ inches long by 2 broad, and we may, therefore, suspect that, like the leaves, it properly belongs to *P. amabilis*.

The range of *P. grandis* is apparently very great. It is found in the Sierra Nevada, of California, down near the southern line of the State, and it is found at least as far north as the British line.

Dr. Bigelow (*Bot. Whipple's Rep.*) says the balsam fir of California is identical with *P. balsamea* of the eastern States, but gives no other description of the tree, as it grows where he observed it, than to note its dimensions—far exceeding those of *P. balsamea* and the quality of the timber furnished by it. While Dr. Bigelow's attainments as a botanist would give, with me, great weight to his testimony, I cannot but suspect that, in this instance, he was misled by the very apparent points of resemblance between the balsam firs of the east and west, and, perhaps, had not an opportunity of examining the mature cones which furnish the best diagnostic characters. In the Sierra Nevada, a few miles from the upper end of the Sacramento valley, we found the western balsam fir growing in profusion and attaining a large size, but

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there exhibiting the same characters as in the Cascades, near the Columbia, and clearly distinguished from *P. balsamea* by its immense size, longer leaves, and different cones. The only decided character which the two species have in common is the accumulation of the balsam in cysts in the trunks of small trees; this is, however, not peculiar to *P. balsamea* among eastern trees, as a similar balsam is secreted on the trunk of *P. Fraseri*.

Dr. Bigelow mentions the occurrencc of the same balsam fir which he saw near Sonora, in California, in the more elevated portions of the San Francisco and Sandia mountains of New Mexico. If this should prove to be the same species with that observed by us further north, in California and Oregon, it would give a very extensive north and south range to the tree—a range of at least 20° of latitude. This will not seem so surprising when we consider the great differences of elevation of its northern and southern habitats, and the great differences of vegetation of the sub-tropical bases and arctic summits of the mountains of New Mexico and southern California.

That the balsam fir of central and northern California are the same, is probable from the fact that the associate trees, *P. ponderosa*, *P. Lambertiana*, *Libocedrus decurrens*, &c., are the same in each case; and the lumbermen and others who have seen the balsam firs in different parts of the Sierra Nevada have regarded them as all of one species.

We first met with *P. grandis* near McCumber's, (lat. 41°, altitude 4,000 feet,) a few miles northeast of Fort Reading, California. It there forms a conspicuous element in the magnificent forest whch I have described in speaking of the sugar and yellow pines, several of which I measured; the trunks were scarcely inferior in girth or altitude to the pines, being twenty-one feet in circumference three feet from the ground, and having an estimated altitude of 150 feet. From this point to the Columbia it was found on all the wooded mountains. The general port of the tree is very well given in the accompanying plate, (VI,) which represents the vigorous and unimpeded growth of an individual about one hundred feet in height. This portrait was taken on the eastern slope of the Cascade mountains, in Oregon, lat. 44° 12′ N., at an elevation of nearly 5,000 feet above the sea. It will be seen to be more spreading than most firs, broader near the top, and less conical. When forming part of the dense forests of the lower Columbia, it is much more slender, and the branches, instead of descending as low as represented in the plate, are confined to the top. Under such circumstances, the trunk is straight, smooth, and cylindrical, and furnishes lumber of excellent quality. On the Columbia and Willamette it is known as the "white fir," to distinguish it from the "red fir," (*Abies Douglasii*.) Most of the lumber exported from Oregon is derived from these two trees.

PICEA NOBILIS. The noble fir.
P. NOBILIS, *Loud. Arboret*, 4, *p.* 2342, *fig.* 2249.
PINUS NOBILIS, *Dougl. Lamb. Pinus*, 3, *t.* 22.
ABIES NOBILIS, *Lindl. Knight's Cyclop.* 1, *p.* 9.
PINUS (ABIES) NOBILIS, *Hook. Flor. Bor.-Amer.* 2, *p.* 162.
ABIES NOBILIS, *Nutt. Sylv.* 3, *t.* 117.

Description.—Tree large, erect, strict; branches short, rigid; leaves in many rows, short, falciform, and curved upward, very rigid, keeled on both sides, ancipital acute, pale green, not glaucous below; cones large, cylindrical, obtuse, fulvous, more or less covered by the reflected bracts; scales triangular, as broad as long, margins reflected, entire; bracts longer than the scale, reflected, fimbriated or entire, terminating in an elongated awn-like point; seed much longer than wide, somewhat angular; wing twice as long as broad, entire, pellucid.

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This splendid species was introduced into England many years since by Douglas, and is now so generally cultivated and well known that any lengthy description of it is unnecessary. It is also so well marked by its short, rigid, acute leaves and large ornamental cones, that it is not likely to be confounded with any other species now known. My own observations do not, however, fully accord with those which have been published in regard to it; and the specimens which I brought home differ so much from those before obtained from the same region, and from each other, that it seems necessary that these differences should be indicated.

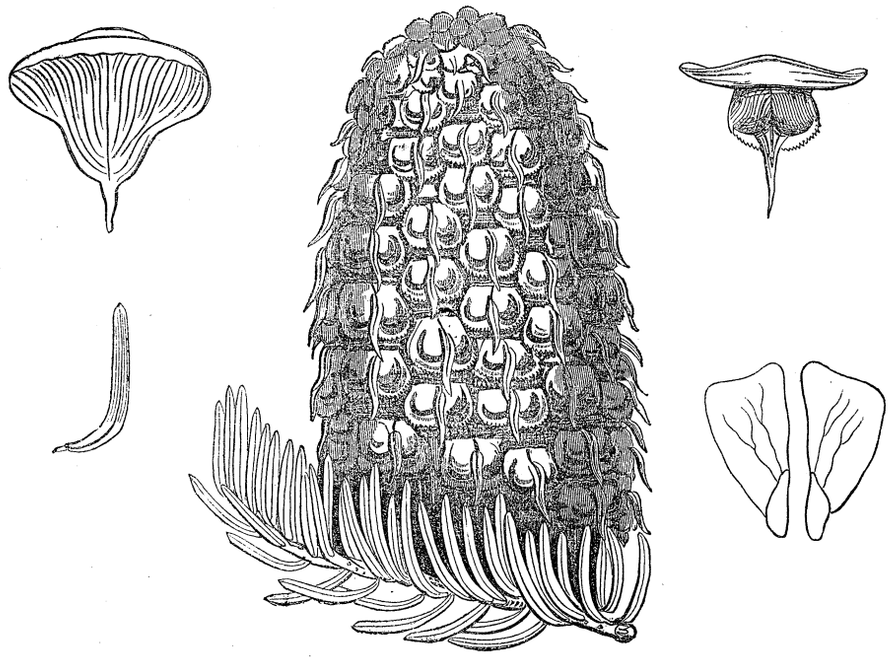

Fig. 17.

Fig. 17. Cone, scales, and seeds of *P. nobilis*, half natural size.
Fig. 17*a*. Leaf of do., natural size.

The accompanying figure (fig. 17) very accurately represents (half size) a cone obtained from a young tree in the Cascade mountains, 150 miles south of the Columbia. It will be seen that it differs from those figured by Lambert, Nuttall, and Loudon, (l. c.,) by being less completely covered by the reflected bracts, and by the form of the bracts, which are much less fimbriated, and are expanded into rounded wings on either side of the elongated point. The scales, seeds, and wings correspond very well with those figured.

The figure now given was made with great care by an excellent artist, J. H. Richard, and may be accepted as a copy of nature, even to the exact size and form of every bract. If the figure given by Nuttall and Lambert is equally true to nature, we have here evidence of considerable variation in the organs which have been considered the most distinctive character of the tree. Loudon's figure (l. c.) is evidently not intended to be an accurate representation of the subject, but only to give the general effect of the reflexed and fimbriated bracts. In his description, drawn from Douglas' specimen, Loudon represents the leaves as 2-rowed; while in my specimen the leaves are in many rows, so thickly set on all sides of the branches that their bases are separated by spaces no larger than they occupy; nor are they trigonal, as those described by Loudon, but quadrangular, without any longitudinal furrow.

A large cone was brought to me from the base of Mount Hood by Mr. C. D. Anderson, which I could refer to no other tree than this; and yet the bracts, though similar in form to those of

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the cone now figured, were much smaller, covering only a very small portion of the surface of the cone; and the characteristic appearance of the cone of *P. nobilis* was entirely lost. The leaves, scales, seeds, and wings were similar to those figured.

It is, perhaps, possible that the differences in the leaves and cones of my specimens and those before described are sufficent to constitute a new species; but as the general resemblance is striking, and I have no authenticated *specimens* of *P. nobilis* with which to compare them, it is perhaps better to wait till more material has been collected, which shall settle the question beyond the possibility of doubt. Several surveying parties will traverse the country occupied by *P. nobilis* within a few months, and they will doubtless supply our deficiencies in this respect. An abundance of excellent seeds were obtained from the cones I have mentioned; and should they germinate, the plants raised from them will soon give us an opportunity of studying the tree at leisure.

The general aspect of *P. nobilis* is somewhat like that of *P. amabilis*, though the foliage is of a lighter green, the leaves and branches more rigid and less graceful. The leaves are so stiff and sharp that they prick the skin like needles. The value of the wood for timber I had no opportunity of determining, but it is probably inferior to that of the Douglas spruce or balsam fig.

PICEA AMABILIS. The western silver fir.
PINUS AMABILIS, *Dougl. in Loud. Arboret* 4, *p.* 2342, *figs.* 2247 *and* 2248.
ABIES AMABILIS, *Pinetum Woburnense*, *t.* 44.

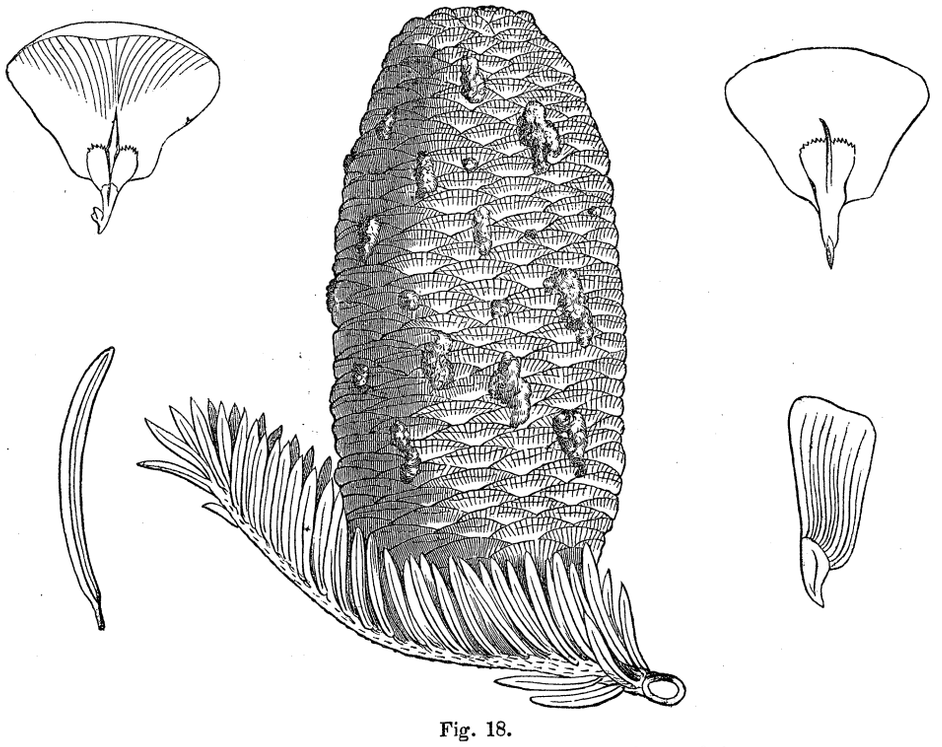

Fig. 18.

Fig. 18. Cone and branch of *P. amabilis*, one-half natural size;
Fig. 18*a*, *b*, *c*, *d*, leaf, scale, and seed of same, natural size.

This beautiful and distinct species has been generally confounded with *P. grandis*, as mentioned in the description of that species. This mistake would never have occurred if Douglas

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had lived to return to England, as they are really very unlike each other, both in general aspect and botanical characters.

We first met with this tree in latitude 44° N., in the vicinity of the "Three Sisters," snow peaks of the Cascade mountains, nearly 150 miles south of the Columbia.

After striking the south fork of the Des Chutes river, on our progress northward, we followed down that branch to its union with the main stream. This we followed to its source in the southern slope of the group of mountains named. Around the mountain lakes in which the Des Chutes takes its rise, we found, at first, a few small trees, and, subsequently, groups and groves of a fir, which, familiar as we were with *P. grandis*—that species having accompanied us all the way from the mountains of California,—was immediately noticed by all our party as a tree entirely new to our experience, and very different from any we had seen. From my notes, made at the time, I take the following passage descriptive of this tree:

"*Cascade mountains, latitude* 44° *N., August* 30.— * * On the rocky ledges which overlook the lakes are a few trees of a fir which we have not before seen. It here forms a tree of moderate height, of strictly conical figure. The foliage is very rich and massive, a dark-green above, silvery beneath; the cones, very large, 6 by 2½ inches; elliptical, obtuse, and of a dark-purple color, with numerous patches of white resin. These erect, and situated near the summit of the tree, sometimes growing on quite small trees, seem disproportionably large, and more than once I have in the distance mistaken them for birds."

Of the many notices of *P. amabilis* which occur in my journal, I select two others which will serve to illustrate the habit and appearance of the tree as it grows in perfection in its native wilds:

"*Cascade mountains, latitude* 44° 17′ (30 miles northwest from last, on headwaters of McKenzie's fork of the Willamette river.)—Our camp to-night is on the borders of a small lake, in a region formerly covered by a dense forest, which, perhaps, thirty years since was all burned off. It has been succeeded by clusters and groves, principally of silver firs, which growing in a fertile soil, and not yet crowding each other, have everywhere assumed the symmetrical forms sometimes seen in the isolated evergreens of cultivated grounds."

The young trees of *P. amabilis* are less regular in form, and are handsomer, than any other fir I have ever seen.

The range of this tree is apparently less extensive than that of *P. grandis*, though how far it extends to the north we have no means of knowing at present.

We did not see it elsewhere than in the Cascade mountains between latitude 44° and 46°; it is found, however, north of the Columbia, and probably exists along the summit of the Cascade range as far south as Mount Pitt, about 42° 40′. I did not see it in the Willamette valley or in the Coast mountains; it is probably confined to the higher portions of these latter mountains, if, indeed, it exists on them.

The wood is white, and would, perhaps, be used for timber if it were accessible. As a timber tree, it is, however, far inferior to many other trees which grow in the valleys and on the coast of Oregon.

Cones of *P. amabilis* were brought home, and seeds have been distributed with a view to its introduction into cultivation. Should this effort be unsuccessful, it may be obtained from England, where it has been grown from seeds sent home by Douglass. I very much regret that it was never convenient for the artist of the party, Mr. Young, to take a portrait of this

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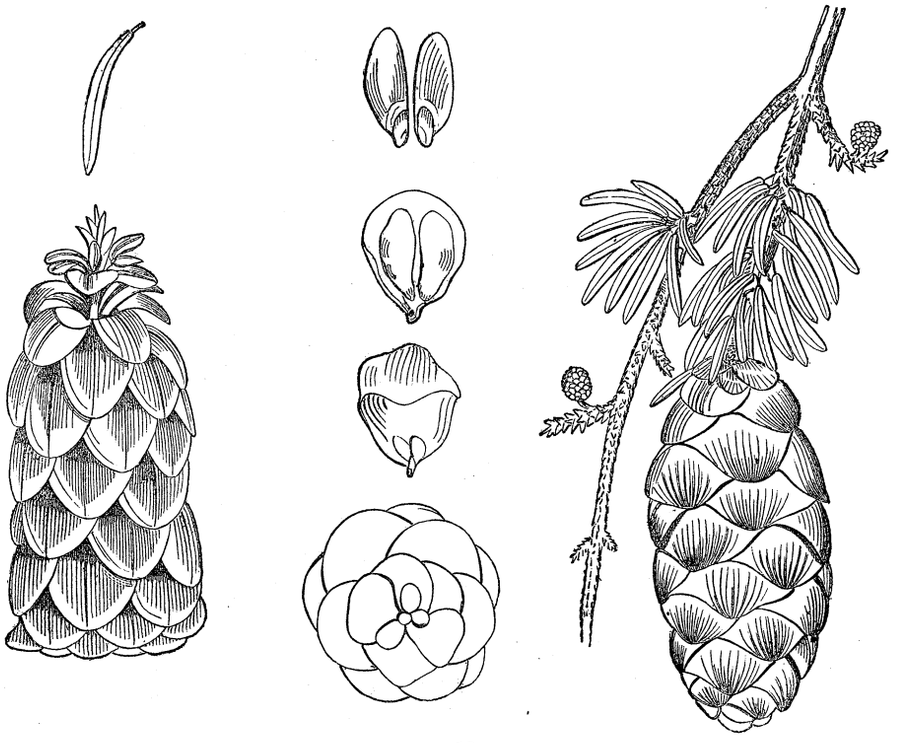
tree; though one would search in vain among cultivated trees for any which should rival in the symmetry of its form, the luxuriance of its foliage, and the size and beauty of its cones, the western silver fir.

"*September* 17.—* * On the little prairie which borders one side of the lake are a few trees of the silver fir. With a strong and unimpeded growth, it has here attained a magnitude I have not elsewhere seen. It rises in denser and more symmetrical cones than any other conifer we have met with. The altitude of the largest is more than a hundred feet; the base of the cone formed, the branches resting on the ground not more than twenty. The branches are so thick as to prevent all access to the trunk without a vigorous use of the hatchet; and during the pouring rain of the last four days, we have always been able to find a dry spot beneath the shelter of its impervious foliage." From these descriptions it will be seen that the silver fir forms a dense and slender spire of dark-green foliage, which, on the older trees, is rather too formal to be pleasing, unless grouped with other species, with which its form and the color of the foliage may contrast agreeably. In the Cascade mountains I often saw it so combined with *P. grandis* and Abies Williamsonii, producing groups which seemed to me to present the extreme limit of arborescent beauty.

ABIES WILLIAMSONII, *Newb.* (Plate VII.) Williamson's spruce.



19.

Fig. 19. Cone, branch, leaves, scales, seeds, and male flower of *A. Williamsonii*, natural size.
Fig. 19*a*, *b*. View of side and base of old cone of *A. Williamsonii*, natural size.

Description.—A tree of large size and alpine habit; foliage somewhat fasciculate like that of the larches; leaves short, acute, compressed, with a lenticular section. Cones pendant, long-ovoid acute, 1½ inch long, purple while young; when old, cylindrical or somewhat conical with a flattened base; scales rounded entire, large, in old cones strongly reflexed, except at the base

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of the cone. Seeds small, ovoid, black, wings elliptical entire pellucid; male flowers in small nearly spherical capitula.

This beautiful fir, one of the finest of the genus, was discovered by us on the summits of the Cascade mountains, latitude 44° north. It is the most alpine in its habit of all the firs; extending from the height of 6,000 feet to the line of perpetual snow. It will, doubtless, be found in similar circumstances on other parts of the Cascade range, but we saw it only about the group of mountains called the Three Sisters. It forms a tree of one hundred feet in height, of which the form is rather spreading and irregular, but remarkably graceful. The foliage is light and feathery, its color a clear, but not dark, yellow green. The cones are pendant, ovoid acute, purple, 1½ inch long by ½ inch wide, somewhat resinous when attached to the tree, but when the seed is discharged, they fall, and present the remarkable appearance of figs. 19*a* 19*b*, the scales being nearly all strongly reflexed, while a few near the base are slightly expanded and not reflexed.

I have given this beautiful tree the name of the commanding officer of the expedition, as a slight acknowledgment of the unremitting kindness which I received in my official capacity while connected with the party, as well as an imperfect expression of the personal esteem which he so uniformly gained from those who were brought into intercourse with him.

ABIES DOUGLASII, *Lindl.* (Plate VIII.) Douglas' Spruce.
A. DOUGLASII, *Lind. in Penny Cyclop.* I, *p.* 32.
PINUS DOUGLASII, *Lamb. Pinus Ed.* 2, 2 *t.* 47.
P. DOUGLASII, *Loudon, Arboret,* 4, *p.* 2319.
P. DOUGLASII, *Nutt. Sylv.* 3, *p.* 129, *t.* 115.
P. DOUGLASII, *Hook. Flor. Bor. Amer.* 2, *p.* 162, *t.* 183.

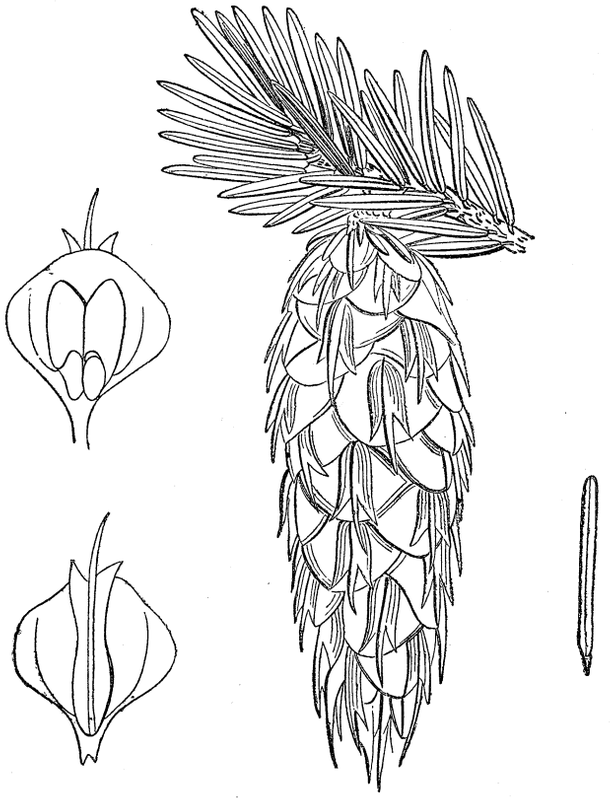

Fig. 20.

Fig. 20. Cone, leaves, aud scales of *A. Douglasii,* natural size

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Description.—A tree of very large size; leaves narrowly linear, one inch long, furrowed above, carinated below, with inflexed margin, slightly glaucous beneath; cones pendulous, long-ovate acute, scales few, large, lax, rounded entire; bracts elongated, strap-shaped, projecting beyond the margin of the scale, terminating in three points, of which the middle one is largest; seed elliptical, acute, nearly half the length of the wing; wing pellucid, margins entire.

This was one of the first, and is now one of the best, known of the trees of the west. From its magnitude and abundance on the Columbia, it was the first to attract the attention of the botanists who have visited Oregon, and was early introduced into England, where it is now extensively cultivated. Full descriptions have been given of it by Douglas, Lindley, Loudon, Nuttall, &c., which are, in the main, accurate. Sabine was in error, however, in supposing that the cones were erect, as in all the species they are pendant. Nuttall also represents the bracts as reflexed. They are not so, however, but always project towards the point of the cone. The figure given by Nuttall does not well represent the cones in any stage, as will be seen by comparing that figure with the one now given, which was taken from a perfect specimen, of which I brought a large number.

The size of *A. Douglasii* has not been over stated. It is, in fact, one of the grandest of the group of giants which combine to form the forests of the far west. I saw several individuals of this species which had a diameter of ten feet four feet from the ground, and an altitude of three hundred. As it usually grows in its favorite habitat, about the mouth of the Willamette, it forms forests of which the density can hardly be appreciated without being seen. The trees stand relatively as near each other, and the trunks are as tall and slender, as the canes in a cane-brake. In this case the foliage is confined to a tuft at the top of the tree, the trunk forming a cylindrical column as straight as an arrow, and almost without branches, for two hundred feet. The amount of timber on an acre of this forest very much exceeds that on a similar area in the tropics, or in any part of the world I have visited. Were it not that vegetable tissue will burn readily, the immense mass of it which encumbers the surface of an ordinary farm on the banks of the Columbia, would bid defiance to any efforts that one man could make for its removal during the term of his natural life.

To show how slender Douglas spruce ordinarily grows, I will give the measurements of a tree, which seemed of only moderate size, lying near one of our camps in the Willamette valley. It was six feet in diameter across the stump. Two hundred and sixteen feet of the trunk lay upon the ground, and the upper extremity was fifteen inches in diameter where it had been burned off.

The wood, like that of most of the spruces, is harder and less pleasant to work than that of the pines. It is, however, very stiff, makes excellent planking, joist, and timber, and for these purposes it is very largely used both in Oregon and California. The rings of annual growth are distinct and widely separated, and the tree is evidently of rapid growth. Douglas spruce covers the western slope of the Cascade mountains and the banks of the Columbia. It extends northward on the Sierra Nevada to the north line of Mexico.

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ABIES MENZIESII. (Plate IX.) Menzies' spruce.
A. MENZIESII, *Dougl. Mss. Lind. Penny Cyclop.* 1, *p.* 9.
A. MENZIESII. *Loudon, Arboret,* 4, *p.* 2321, *fig.* 2332.
PINUS MENZIESII. *Lamb. Pinus* 3, *t.* 19.

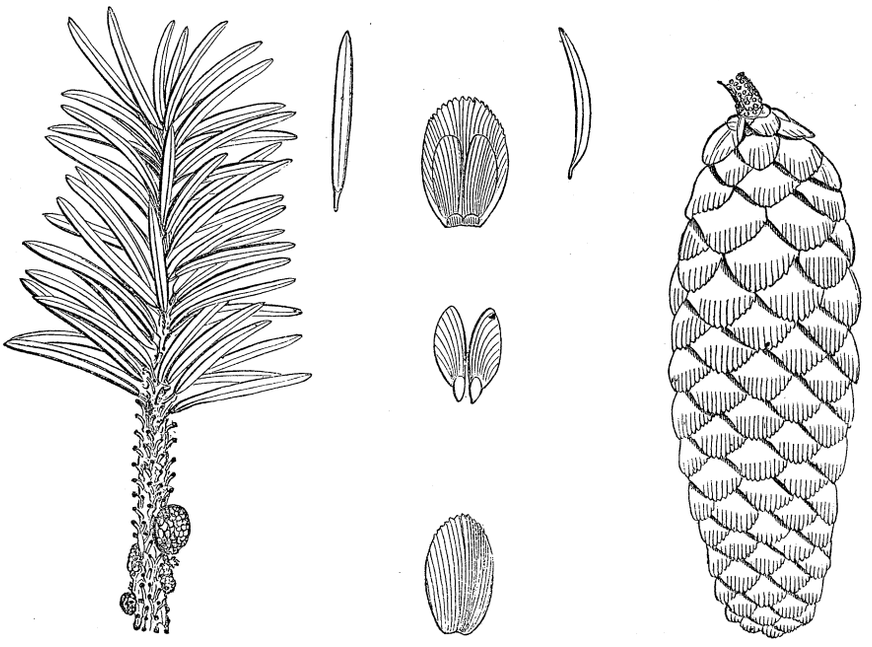

Fig. 21.

Fig. 21. Cone, scales, seeds, leaves, and branch of *A. Menziesii*, natural size.

Menzie's spruce, like that of Douglas, was long since collected by the English botanists who visited the Columbia, and is already introduced into cultivation in Europe.

It grows most abundantly and attains the largest size on the coast near the mouth of the Columbia, forming there the greater part of the forest.

It never attains dimensions so gigantic as those of *A. Douglasii*, but forms a tall and very strict tree, of which the foliage is more rigid than that of any other American abies. The leaves are so rigid and acute as sometimes to prick the skin like needles. The cones, where I have seen them, never exhibit the appearance presented in Nuttall's figure, but are much more slender, and with eroded bracts, as represented in the figure.

THUJA GIGANTEA. The great arbor vitæ.
T. GIGANTEA. *Nutt. Sylv. p.* 400, *t.*

The western arbor vitæ is undoubtedly the finest species of the genus. It resembles somewhat the species so common about the great lakes, *T. occidentalis*, but is not only a much larger and finer tree but the foliage is handsomer.

It grows in the greatest abundance in most parts of Oregon; within the range of my observation, much more abundantly and attaining the largest size near the coast; though said by Nuttall to grow in perfection on the Upper Columbia. The finest trees I saw of it are in the vicinity of Port Orford. It there constitutes an important part of the forest, and attains a size scarcely inferior to that of the sugar pine or Douglas' spruce.

The foliage, from the regularity of the divisions of the minor branches, and from the accuracy

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with which its scale-like leaves are fitted to each other, resembles the fronds of ferns, and is exceedingly beautiful.

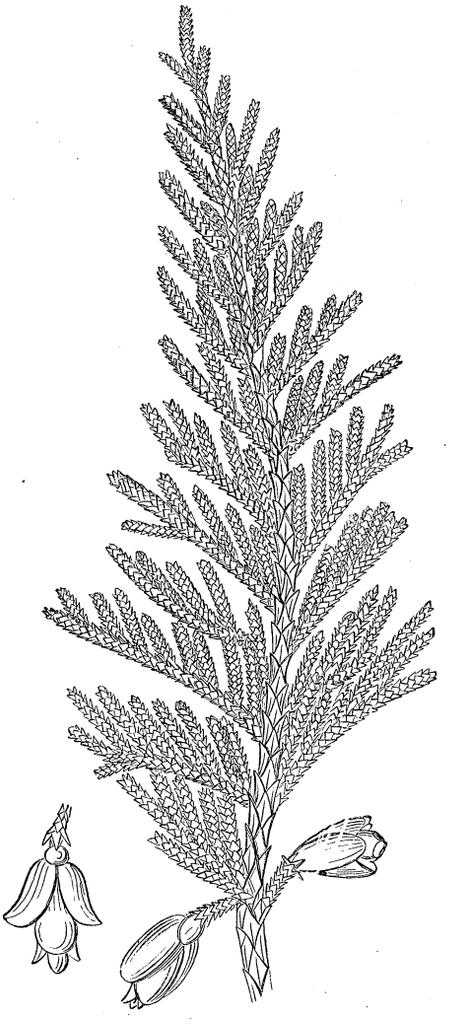

Fig. 22.

Fig. 22. Leaf, cone, and seed of *T. gigantea*, natural size.

The branches are more drooping than on the common white cedar, and the tree more symmetrical and yet more graceful.

The wood is white and easily worked, and is much esteemed for lumber when the tree grows luxuriantly.

SEQUOIA SEMPERVIRENS. The redwood.
S. SEMPERVIRENS. *Endl. Syn. Conif. p.* 198.
S. SEMPERVIRENS. *Gray in Sill. Jour.*, 2*d ser.* 18, *p.* 150.
TAXODIUM SEMPERVIRENS. *Lamb. Pinus, ed.* 2, 2, *t.* 64.
T. SEMPERVIRENS. *Hook. & Arn. Bot. Beach. p.* 392.
ABIES RELIGIOSA. *Schlecht & Chamiss. in Linn.* 5, *p.* 77.

The redwood is the second in size and the first in importance of all the trees of California, though not far surpassing the sugar pine in either respect.

It is said nearly to equal in dimensions the other species of *Sequoia*, which has been specially

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designated as the "mammoth tree." Of all the redwoods which I saw, there was, probably, none greater than fifteen feet in diameter and three hundred feet in height, but I was told that in the vicinity of Humboldt bay individuals existed which were over twenty feet in diameter.

Fig. 23.

Fig. 23. Branch of *S. sempervirens*, with leaves, cone, and male flower; natural size.

The value of the redwood to the people of California is, however, not dependent on its size but on the excellence of its timber and the proximity of forests of it to the ocean. It is spread over the coast mountains, for the most part to the exclusion of other trees, from the line of 42° to the northern line of Mexico, but it is nowhere found at any considerable distance from the sea.

The form of the tree is considerably like that of the sugar pine and mammoth tree, a straight, cylindrical trunk rising to a great height, festooned and ornamented, rather than loaded, with branches. Young trees, however, do not exhibit so great a disproportion between the trunk and branches.

The foliage, as is common among its congeners, the junipers, cypress, &c., is dimorphous on young trees, the leaves being long, linear, spreading, and considerably resembling those of *Taxus* and *Taxodium*. In the older trees they are closely appressed.

The cones are elliptical in form, of a length of two inches, and have a general resemblance to those of the cypresses.

The wood of the redwood is, as its name implies, dark red in color, and is considerably like that of the red cedar, *J. Virginiana*. It splits with great facility, and is frequently converted into plank and boards without the aid of a saw. It is said to be very durable, and though somewhat wanting in tenacity is of the greatest value to the inhabitants of California.

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JUNIPERUS OCCIDENTALIS. [Plate X.] The western juniper.
J. OCCIDENTALIS, *Hook. Flor. Bor. Amer.* 2, *p.* 166.
J. ANDIANA. *Nutt. Sylv.* 3, *p.* 95, *t.* 110.

This tree, which is well represented in the accompanying plate, closely resembles in its general aspect its eastern representative, *J. Virginiana*, but is distinguished from it by the larger size of its berries; by its more glandular and resinous leaves, which are also less acute; and by the character of its wood, which, in all the trees examined, was white, not at all resembling the dark and fragrant wood of the red cedar.

We found it abundant on rocky and barren surfaces east of the Sierra Nevada and Cascade mountains from Pit river to the Columbia.

The largest individual of the species noticed had a diameter of three feet near the ground and an altitude of about forty feet.

The fruit forms an important part of the subsistence of several kinds of birds, especially of Prince Maximilian's jay and Townsend's Ptilogonys.

LARIX OCCIDENTALIS. The western larch.
L. OCCIDENTALIS. *Nutt. Sylva.* 3, *p.* 143 *t.* 120.

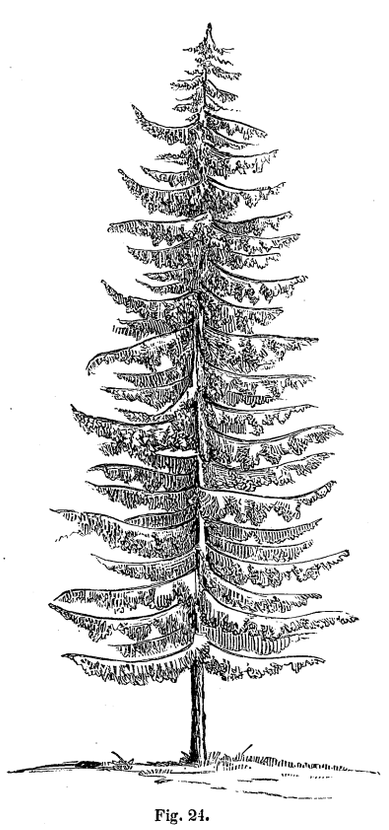

Fig. 24.

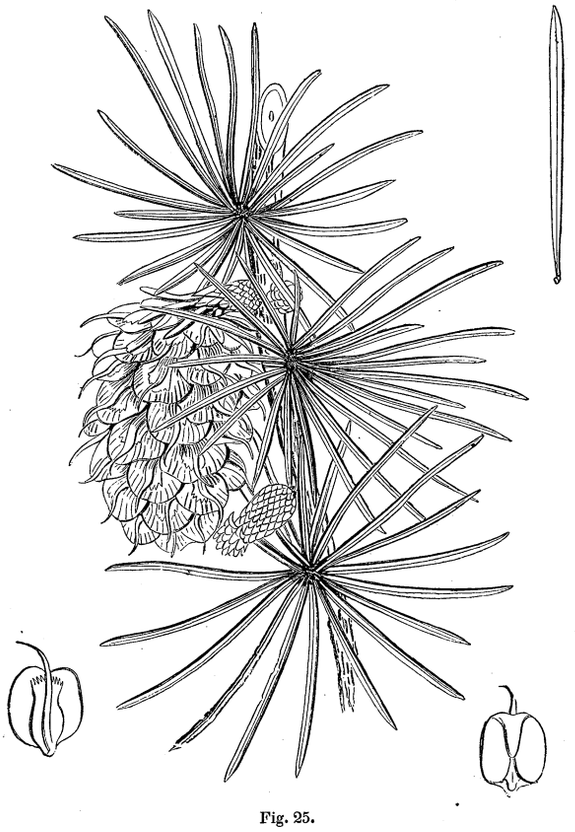

Fig. 25.

Fig. 24. Young tree of *L. occidentalis.*
Fig. 25. Leaves, cone, and scale of do., natural size.

Description.—A large tree, very tall and slender; branches short and small; foliage thin, light yellowish-green; leaves long, narrowly linear, thin carinated above and below, more slender and delicate than those of any other species; cones ovoid, $1\frac{1}{4}$ inch long, reflexed; scales

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shortly ovoid, truncated, or broadly emarginate; edges thin, membranaceous; bracts imperfectly elliptical, fimbriated, terminating in a long awn, which projects beyond the margin of the scale; male flowers?

I have had some little doubt in referring the larch which we found in Oregon Territory to *L. occidentalis* of Nuttall, as we saw none which fully corresponded to his description. He represents the tree as having, among other characters, the shortest and broadest leaves of all the species of the genus. On the contrary, the larches, from one of which the specimen figured was taken, were remarkable for their very long, slender, and delicate leaves, in that respect excelling the "tamarack" of the eastern States, as well as the larch of Europe. The cones were, however, so nearly like those described by Nuttall that there is little probability that the trees observed by him and those seen by our party are of different species.

We first met with the larch on the Des Chutes river near its head, lat. 43° 40′ N.; from that point it extends northward to, and beyond the Columbia. The impression made upon me by this tree when we first saw it will be seen in the following extract from my note book:

"*Des Chutes Basin, September* 3.—Our camp is pitched under a tree which we have not before met with—the western larch. This is very unlike the tamarack of the eastern States, both in its ports, its foliage, and in its cones. I have not yet seen it occupying the cranberry marshes, as the tamarack is so prone to do, but it grows scattered along the borders of the streams, rising to a height of a hundred and fifty feet, with a diameter at base of two or three. The branches are very short, and the tree, as it grows in this vicinity, is more strict than any I have seen. The leaves are long and slender, the foliage very light and feathery, and the color pale bluish-green. The cones are larger than in *L. americana*, and the scales are furnished with long and slender projecting bracts."

TAXUS BREVIFOLIA. The western yew.

T. BREVIFOLIA. *Nutt. Sylva.* 3, *p.* 86, *t.* 108.

T. BACCATA, *Hook, Flor. Bor. Amer.* 2, *p.* 167, (*in part.*)

T. LINDLEYANA, *Murray, Edin. New Philo. Jour.* 1855, *p.* 294.

The differences in general aspect, exhibited by the yew of the northern States of the Atlantic coast and Mississippi valley, and that of the western coast, are so striking, that, at first sight, there seems no difficulty in distinguishing them, but, upon more thorough investigation, it is found to be a matter of no little difficulty to fix upon characters which can be regarded as diagnostic, and will serve to separate them.

Taxus Canadensis, as it grows about the great lakes, is a low, trailing shrub, on the shores of Lake Superior forming a thick and tangled undergrowth, covering the surface in the pine and hemlock forests, and seldom rising more than three or four feet from the ground; the leaves 1 to $1\frac{1}{4}$ inch long, dark, sombre-green in color, mucronate, and with somewhat revolute margins.

The yew of Oregon and California, where we saw it in the valley of the Willamette, forms an upright tree 50—75 feet in height; the foliage thin and rather light yellow green; the leaves $\frac{3}{4}$—1 inch long, acuminate, and mucronate; margins revolute; flowers and fruit as in *T. Canadensis.*

From this comparison it will be seen that the principal differences between the eastern and western yews are found on the upright arboreal habit, the lighter foliage, and in the shorter leaves of the western plant.

If these characters were constant they would serve as the basis of a specific distinction; but the range of variation is so great in the European yew, *T. baccata*, and in *T. Canadensis*, that

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we may expect to find a somewhat similar variety in those of different localities in the west. If so, the diagnostic characters mentioned will probably be found to have little value.

Fig. 26.

Fig. 26. Branch, leaves, and male flowers of *T. brevifolia*, ½ natural size.

Until such time as these—now regarded as distinct species—shall be found running into each other, it is, perhaps, better to consider them as specifically different.

The aspect of the western yew is considerably different from the arborescent yew of Europe. Its growth is more open, the foliage lighter and more feathery, and much lighter in color.

The yew is found on the Sierra Nevada, down nearly or quite to the southern line of California.

T. Lindleyana, described by Murray, (l, c,) is undoubtedly identical with *T. brevifolia;* and in his description Mr. M. has noticed the characters of the Oregon tree which I have mentioned, as distinguishing it from the yews of Europe and the eastern States.

TORREYA CALIFORNICA. The Californian nutmeg tree.

T. CALIFORNICA. *Torr. N. Y. Jour. Pham.* 3, *p.* 49.

T. MYRISTICA, *Hook, Bot. Mag. t.* 4780.

I did not meet with the "nutmeg tree" in California, though it occurs in the coast mountains, very near some localities which we visited. The specimens which have come into my hands were collected by other persons, to whom I am indebted for whatever knowledge I have of its habit and distribution.

It is said to be found in many localities in the coast mountains, both north and south of San

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Francisco, but to be everywhere rather a rare tree. It attains but a moderate size, 50—75 feet in height, and has somewhat the aspect of a *Taxodium*, or yew, to the foliage of which its leaves have a marked resemblance. The fruit, from its texture and appearance, has been compared to a nutmeg, but is too strongly charged with turpentine to be used as a condiment.

Fig. 27.

Fig. 27. A branch, with leaves and fruit of *T. Californica*, natural size.

Very full analyses of its botanical characters are given by Nuttall and Sir W. Hooker. It is said to form a graceful and handsome tree, and, as its nuts have been made to germinate by the horticulturists of New York, we may soon expect to see it introduced into general cultivation.

CUPRESSUS NUTKATENSIS. The Nootka cypress.
C. NUTKATENSIS, *Lamb. Pinus, No.* 60.
C. NUTKATENSIS. *Hook. Flor. Bor. Amer.* 2, *p.* 165.
THUJA EXCELSA, *Bong. Veget. de Sitcha, p.* 46.

Description.—A tree of moderate size; branches sub-erect, tetragonal; leaves ovate acuminate, imbricate in four rows without tubercles; galbules as large as peas, or larger, terminating the smaller branches; scales umbonate, smooth, or radiately striate.

The only locality in which we met with this tree was on the Cascade Mountain, about latitude 44° north, though I have reason to believe that it will be found at intervals throughout the Sierra Nevada and the Cascades, in California and Oregon.

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The individuals which we saw of the species were not handsome. They formed trees of moderate size, having much the appearance of *Thuja occidentalis* when growing under the most unfavorable circumstances. The trunk was gnarled and twisted, and set with dead branches; the foliage sparse and ragged, and the whole aspect disagreeable. The galbules, which were numerous, were something larger than a pea, and composed of four scales; from the centre of each a point projects.

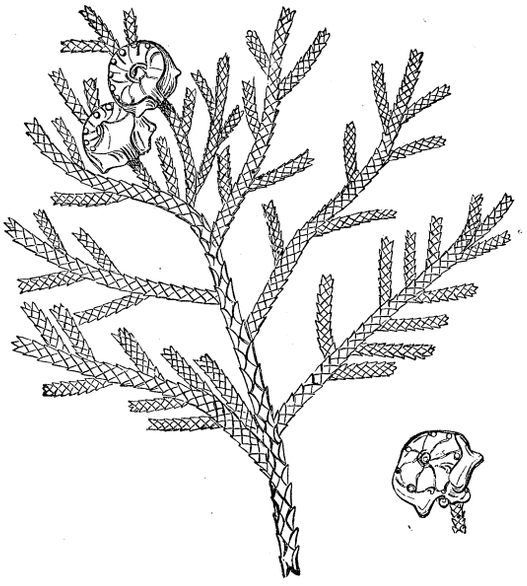

Fig. 28.

Fig. 28. Branch and galbules of *C. Nutkatensis*, natural size.

The locality where we found this tree was near the snow line, and it is possible that it was dwarfed and deformed by the severities of the climate. It is found on the low lands near the coast and on Vancouver's island. *Cupressus Lawsoniana*, described by Mr. Murray, (*Edinb. New Philos. Jour.*, 1855,) is closely allied to this species, but differs from it in having six scales on the cones.

LIBOCEDRUS DECURRENS. The California white cedar.

L. DECURRENS, *Torrey in Smithsonian Contrib.* 6, *p.* 7, *t.* 3.

This tree is very extensively distributed over California and southern Oregon, where it is found in nearly all parts of the mountains of the interior. We found it more abundant and attaining the greatest size at McCumber's, in northern California. It there rivals even the sugar pine in diameter of trunk, though never obtaining an equal altitude. Many of the white cedars about McCumber's are six to seven feet in diameter three feet above the ground, with an altitude of more than one hundred feet.

The general aspect of the tree is strikingly like that of *Thuga occidentalis* as it grows about Lake Superior. The general form conical; the trunk angular, or at least not cylindrical; the bark fibrous, and the lower part of the trunk usually bristling with the dead but persistent branches. The foliage is also very like in its general aspect to that of the tree referred to, and the wood is of similar character and of about equal economical value. I noticed about McCumber's that the trees cut for the saw-mills, though externally apparently sound and healthful, were affected by a singular kind of dry-rot, by which the trunk was honeycombed

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and rendered valueless. This kind of decay seemed to affect the wood in a great number of detached points at the same time, and not to be connected with any external injury.

The fruit of the *Libocedrus* is very different from that of any of its congeners, and is well represented by the plate given in *P. Frémont.* (l. c.) by Dr. Torrey, except that it is always pendulous and not erect, as there represented.

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No. 2.

GENERAL CATALOGUE OF THE PLANTS COLLECTED ON THE EXPEDITION.

BY J. S. NEWBERRY,
ASSISTED BY ASA GRAY AND JOHN TORREY, AS SPECIFIED IN THE PROPER PLACES.

I. EXOGENOUS PLANTS.

RANUNCULACEÆ.

CLEMATIS LIGUSTICIFOLIA, *Nutt.; Torr. & Gray, Flor. N. Amer.* 1, *p.* 9. Banks of Sacramento river, Cal.; July, in flower. Klamath Basin, Pit river; August, in fruit. Dalles of the Columbia.

RANUNCULUS AQUATILIS, *Linn.; Pursh. Fl.* 2, *p.* 395; *DC. Prod.* 1, *p.* 26. McCumber's Flat; July, in flower. Pit river; July, in fruit. Common in N. Cal. and Oregon. Wherever observed, this plant had large flowers, and no emerged leaves.

RANUNCULUS OCCIDENTALIS, *Nutt.; Torr. & Gray, Flor. N. Amer.* 1. *p.* 22. McCumber's Flat, N. Cal.

RANUNCULUS PURSHII. (?) *Richardson, Hook. Flor. Bor.-Amer.* 1, *p.* 15. Upper Klamath lake, O. T. Plant very small, and may be distinct from *R. Purshii.*

RANUNCULUS CALIFORNICUS, *Benth. Plant. Hartweg*, 1628. R. dissectus, *Hook. Bot. Beech. p.* 316. R. delphinifolius, *Torr. & Gray, Flor. Suppl. p.* 659. Petaluma, Cal.; common in the Sacramento valley.

ACONITUM NAPELLUS, *Linn.* var. DELPHINIFOLIUS, *Seringe; Torr. & Gray, Flor.* 1, *p.* 34. Head of Des Chutes river. Cascade mountains, O. T.; September, in flower.

THALICTRUM DIOICUM, *Linn.; DC. Prodr.* 1, *p.* 12; *Hook. Flor. Bor.-Amer.* 1, *p.* 3; *Torr. & Gray, Flor. I, p.* 38. Sacramento valley, Cal.

AQUILEGIA CANADENSIS, *Linn.; Torr. & Gray, Flor. N. Amer.* 1, *p.* 29. A. formosa, *Fisch. in DC. Prodr.* 1, *p.* 20. Shingletown and McCumber's Flat, N. Cal.; large, showy, grows in moist places.

DELPHINIUM DECORUM, *Fisch. & Meyer, Hort. Petrop., p.* 32. Fort Reading, Cal.

DELPHINIUM PATENS, *Benth. Plant, Hartweg*, 1632. Crater pass, Cascade mountains, Oregon; September 1.

DELPHINIUM AZUREUM, *Michx. Flor.* 1, *p.* 314. Shores of San Pablo bay; July.

DELPHINIUM MENZIESII, *DC. Hook. Flor. Bor.-Amer.* 1, *p.* 25. Hat creek, Cal.; July.

DELPHINIUM NUDICAULE, *Torr. & Gray, Flor. N. Amer.* 1, *pp.* 33 & 661. D. sarcophyllum, *Hook. & Arn. Bot. Beechey, p.* 317. Sonoma, Cal.; flowers red.

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ANEMONE ALPINA, *Linn.; Hook. Flor. Bor.-Amer.* 1, *p.* 5.; *DC. Prodr.* 1, *p.* 17. Crater pass, Cascade mountains, Oregon; September, in fruit. Willamette valley; May, in flower; from Dr. Evans.

PÆONIA BROWNII, *Dougl.; Torr. & Gray, Flor. N. Amer.* 1, *p.* 41. P. Californica, *Nutt.* Cascade mountains, Oregon; lat. 44° 30′.

The flowers of this plant are erect, but when the seed is nearly ripe the stalks which support the carpels curve downward and outward until the carpels themselves rest on the ground accurately inverted. The dehiscence of the carpels takes place at the summit, and the bean-like seeds are carefully deposited on the ground and roofed over by the persistent carpels, probably through the winter.

On the banks of Mpto-ly-as river, near the base of Mount Jefferson, Oregon, at an altitude of 5,000 feet, in September, I found large surfaces covered with this plant, which had already been touched by the frost. Of the hundreds of clusters of pods, all were inverted and resting on the ground, completely covering the seed, which had generally fallen out. The carpels are from 3 to 5 in a cluster, the number varying in the same plant.

ACTÆA SPICATA, *Linn.* VAR RUBRA, *Bigelow, Flor. Bost. ed.* 2*d*, *p.* 211. Cascade mountains; lat. 44° 12′.

BERBERIDACEÆ.

BERBERIS AQUIFOLIUM, *Pursh. Flor.* 1, *p.* 219, *t.* 4. Banks of Pit river and Klamath basin.

BERBERIS GLUMACEA, *Spreng.; Lindl. Bot. Reg. t.* 1425. Mahonia nervosa, *Nutt. Gen. I, p.* 212. M. glumacea, *DC. Prodr.* 1, *p.* 19. Very abundant in spruce forests in Cascade mountains and Willamette valley, O. T. Fruit blue, acid, but eatable; called Oregon grape.

ACHLYS TRIPHYLLA, *DC.; Hook. Flor. Bor.-Amer.* 1, *p.* 30, *t. XII.* Willamette valley; May, in flower; Cascade mountains, O. T.; September, in fruit. This singular plant grows in moist places, and has much the habit and appearance of Jeffersonia diphylla. The flower is quite fragrant.

CRUCIFERÆ.

LEPIDIUM NITIDUM, *Nutt.; Torr. & Gray, Flor.* 1, *p.* 116. San Francisco, Cal.

NASTURTIUM LYRATUM, *Nutt.; Torr. & Gray, Flor.* 1, *p.* 73. Dalles of the Columbia, O. T.; October, in flower.

CARDAMINE PAUCISECTA, *Benth. Plant. Hartw.* 1646. Petaluma, Cal.

BARBAREA VULGARIS, *R. Br.; Benth. Plant. Hartw. p.* 297, *No.* 1645. Shores of Klamath lake.

ERYSIMUM ELATUM, *Nutt.; Torr. & Gray, Flor.* 1, *p.* 95. Common in Sacramento valley and Klamath basin.

CAPSELLA BURSA-PASTORIS, *Moench.; Torr. & Gray, Flor.* 1, *p.* 117. Fort Vancouver, W. T. Introduced.

FUMARIACEÆ.

DIELYTRA FORMOSA, *DC. Syst.* 2, *p.* 109; *Torr. & Gray, Flor. N. Amer.* 1, *p.* 67. Cascade mountains, O. T.; August.

PAPAVERACEÆ.

ESCHSCHOLTZIA DOUGLASII, *Hook. & Arn. Bot. Beechey, p.* 320; *Torr. & Gray, Flor.* 1, *p.* 664. Suisun valley; July, in flower.

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ESCHSCHOLTZIA CALIFORNICA, *Cham.; Torr. & Gray, Flor.* 1, *p.* 664. Fort Reading, Cal.; April, in flower; July, in fruit.

PLATYSTEMON CALIFORNICUM, *Torr. & Gray, Flor.* 1, *p.* 65; *Benth. Hort. Trans.* (*2d series*) 1, *p.* 407. Petaluma, Cal.

PLATYSTIGMA LINEARE, *Benth. l. c.; Torr. & Gray, Flor.* 1, *p.* 65. San Pablo bay.

NYMPÆAHACEÆ.

NUPHAR ADVENA, *Ait.; Pursh. Flor.* 2, *p.* 369; *Torr. & Gray, Flor.* 1, *p.* 58. Whole plant large; pods of the size of an egg. Common in the Klamath basin. Klamath marsh is half covered by the floating leaves. The seeds, which fill the large pods, are larger than those of the eastern plant, and form an important article of subsistence among the Indians. We saw many hundred bushels of the pods collected for winter use. The seed tastes like that of the broom corn, and is apparently very nutritious.

VIOLACEÆ.

VIOLA ADUNCA, *Smith in Rees' Cycl.; Hook. Flor. Bor.-Amer.* 1, *p.* 79. Willamette valley, O. T.; October, in flower.

VIOLA LONGIPES, *Nutt.; Torr. & Gray, Flor.* 1, *p.* 140. Willamette valley, O. T.; Petaluma, Cal.; October, in flower.

VIOLA SARMENTOSA, *Dougl.; Hook. Flor. Bor.-Amer.* 1, *p.* 80. San Francisco and Sonoma.

VIOLA PEDUNCULATA, *Torr. & Gray, Flor.* 1, *p.* 141. San Francisco, Cal.

VIOLA CHRYSANTHA, *Hook. Ic.* 1, *t.* 49. *Torr. & Gray, Flor.* 1, *p.* 134. Fort Reading, Cal.

VIOLA SHELTONI, *Torr. in Whipple's Rep.* Banks of Yuba river, Sacramento valley; July.

VIOLA CUCULLATA, *Ait.; Torr. & Gray, Flor.* 1, *p.* 139. Willamette valley; October, in flower.

VIOLA OCELLATA, *Torr. & Gray, Flor.* 1, *p.* 142. Near San Francisco, Cal.

MESEMBRYANTHEMACEÆ.

MESEMBRYANTHEMUM DIMIDIATUM, *Harv.* Common along the shores of the straits at San Francisco, where it has been probably introduced.

HYPERICACEÆ.

HYPERICUM SCOULERI, *Hook. Flor. Bor.-Amer.* 1, *p.* 111. McCumber's, N. Cal.; July, in flower; and Klamath basin, O. T.; August, common.

CARYOPHYLLACEÆ.

MOLLUGO VERTICILLATA, *Linn.; Torr. & Gray, Flor.* 1, *p.* 76. McCumber's Flat, N. Cal.

SILENE DRUMMONDI, *Hook. Flor. Bor.-Amer.* 1, *p.* 89. *Torr. & Gray, Flor.* 1, *pp.* 91 & 675. McCumber's and Klamath basin; July and August.

STELLARIA LONGIPES, *Goldie, in Edinb. Phil. Jour.* 6, *p.* 185; *DC. Prodr.* 1, *p.* 400.; *Torr & Gray, Flor. I, p.* 184. McCumber's Flat, N. Cal.

STELLARIA NITENS, *Nutt. in Torr. & Gray, Flor.* 1, *p.* 184. Near Portland, Oregon; Oct.

PORTULACACEÆ.

CLAYTONIA ALSINOIDES, *Sims, Bot. Mag. t.* 1309; *Torr. & Gray, Flor.* 1, *p.* 199. Cascade mountains, O. T.; August 26.

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CLAYTONIA PERFOLIATA, *Don. Bot. Mag. t.* 1336; *Torr. & Gray, Flor.* 1, *p.* 200 & 676. Near San Francisco, California; May.

CLAYTONIA PARVIFOLIA, *Mocino, in DC. Prodr.* 3, *p.* 361. C. filicaulis, *Hook. Flor. Bor.-Amer.* 1, *p.* 224. McCumber's, Northern California; July.

CALANDRINIA MENZIESII, *Hook. Flor. Bor.-Amer.* 1, *p.* 223, *t.* 10; *Torr. & Gray, Flor.* 1, *p.* 197. Fort Reading, California; April.

SPRAGUEA UMBELLATA, *Torr. Plant. Fremont. p.* 4, *t.* 1. McCumber's, California. Crater Pass, Cascade mountains, altitude 6,700 feet. At McCumber's this plant has acute leaves, erect flower stems, and pale cream-colored flowers. On the summits of the Cascade mountains I found the whole plant spread mat-like on the sand, small, with truncated leaves and purple flowers and stems.

STERCULACEÆ.

FREMONTIA CALIFORNICA, *Torr. Pl. Fremont. in Smithson. Contrib.* 6, *p.* 5, *t.* 2. Near Fort Reading, California. July 27–30, in fruit.

MALVACEÆ.

SIDALCEA MALVÆFLORA, *Gray. Pl. Wright.* 1, *p.* 16. McCumber's and Hat Creek, N. California; August 1 to 10; in flower.

SIDALCEA HIRSUTA, *Gray. Pl. Wright* 1, *p.* 16. S. delphinifolia, *Gray, Pl. Fendl. p.* 19, McCumber's, July 29; in flower.

SIDALCEA HARTWEGI, *Gray. Pl. Fendl., p.* 209; *Benth. Pl. Hartw. p.* 300. Fort Reading; April, in flower.

MALVA BOREALIS, *Wallr.; Gray. Pl. Fendl., p.* 15. M. obtusa, *Torr. & Gray, Flor.* 1, *p.* 225. Common in the southern portions of the Sacramento valley.

MALVA HEDERACEA, *Dougl. in Hook. Flor. Bor.-Amer.* 1, *p.* 107. Near Benicia; July 1, in flower.

LINACEÆ.

LINUM PERENNE, *Linn.; Torr. & Gr. Flor.* 1, *p.* 204; *Hook. Flor. Bor.-Amer.* 1, *p.* 106. Common in northern California and Klamath basin; used by the Indians for making twine, of which they make nets for catching fish and birds.

LINUM CALIFORNICUM, *Benth. Pl. Hartw., p.* 298. McCumber's, Northern California; July. Much smaller plant than the last; flowers white.

GERANIACEÆ.

GERANIUM INCISUM, *Nutt.* G. albiflorum var. incisum, *Torr. & Gr. Flor.* 1, *p.* 208. G. albiflorum, *Hook. Flor. Bor.-Amer.* 1, *p.* 116, *t.* 40. On the banks of a small tributary of the Columbia, near the Dalles. October 1, in flower; flowers nearly white.

ERODIUM CICUTARIUM. *L'Herit., DC. Prodr.* 1, *p.* 646; *Torr. & Gray, Flor.* 1, *p.* 208. Common in all parts of the Sacramento valley, in the Klamath basin, and on the Columbia. In flower from June to November.

OXALIDACEÆ.

OXALIS CORNICULATA, (*Linn.*) *Arn.; D.C. Prodr.*, 1, *p.* 692; *Hook. Flor. Bor.-Amer.* 1, *p.* 117. Willamette valley, O. T.; October, in flower. San Francisco, California; November.

OXALIS OREGANA, *Nutt. in Torr. & Gray, Flor.* 1, *p.* 211. Willamette valley, O. T.; October.

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O. Acetosella, *Hook. Flor. Bor.-Amer.* 1, *p.* 118, *in part.* Flowers large, pink; whole plant larger than O. Acetosella, as it grows on the shores of Lake Superior.

LIMNANTHACEÆ.

LIMNANTHES DOUGLASII, *R. Br. in Lond. & Edinb. Philos. Mag. July*, 1833; *Benth. Hort. Trans.* (2 *ser.*) 1, *p.* 409. Shores of San Pablo bay; April.

ANACARDIACEÆ.

RHUS DIVERSILOBA, *Torr. & Gray, Flor.* 1, *p.* 218. R. lobata, *Hook. Flor. Bor.-Amer.* 1, *p.* 127. Common throughout northern California; more rare in the Klamath basin. Specimens from Fort Reading; April, in flower, July, in fruit. Berries white; called by the inhabitants of California "poison oak." Several of our party were poisoned by it, and it also affected some of our mules.

ACERACEÆ.

ACER MACROPHYLLUM, *Pursh. Flor.* 1, *p.* 267; *Hook. Flor. Bor.-Amer.* 1, *p.* 112, *t.* 38; *Nutt. Sylv.* 2, *p.* 76, *t.* 67. Cascade Mountains and Willamette Valley, O. T.

ACER CIRCINATUM, *Pursh, Flor.* 1, *p.* 266; *Hook. Flor. Bor.-Amer.* 1, *p.* 112, *t.* 39. Willamette valley, O. T.

ACER GLABRUM, *Torr. Ann. Lyc. Nat. Hist. N. York*, 2, *p.* 172. Cascade mountains, O. T.

ACER TRIPARTITUM, *Nutt. in Torr. & Gray, Flor.* 1, *p.* 247. Cascade mountains, O. T.

HIPPOCASTANACEÆ.

ÆSCULUS CALIFORNICA, *Nutt. in Torr. & Gray, Flor.* 1, *p.* 251, *& Sylva*, 2, *p.* 69, *t.* 64. Common throughout the valleys of California. In flower July 1st.

CELASTRACEÆ.

EUONYMUS OCCIDENTALIS, *Nutt. in Torr. & Gray, Flor.* 1, *p.* 258. Coast near San Francisco; May, in flower. Very nearly allied to *E. atropurpureus;* perhaps not distinct.

RHAMNACEÆ.

RHAMNUS PURSHIANUS, *DC.; Hook. Flor. Bor.-Amer.* 1, *p.* 123, *t.* 43.

FRANGULA CALIFORNICA, *Gray, Gen. Illust.* 2, *p.* 178, *& Pl. Wright.* 2, *p.* 28. R. oleifolius, *Hook. Flor. Bor.-Amer.* 1, *p.* 123. R. laurifolius, *Nutt.; Torr. & Gray, Flor.* 1, *p.* 263. Fort Reading; July. Shore of Klamath lake; August, in fruit.

CEANOTHUS VELUTINUS, *Dougl. in Hook. Flor. Bor.-Amer.* 1, *p.* 125, *t.* 45. Common in the Cascade mountains, O. T. The pubescence of this plant is very variable, and I have been unable to distinguish it from *C. levigatus.*

CEANOTHUS THYRSIFLORUS, *Esch.; Bot. Reg.* 30, *t.* 38; *Torr. & Gray, Flor.* 1, *p.* 266; *Nutt. Sylv.* 2, *p.* 43, *t.* 57. Very common about San Francisco.

CEANOTHUS PROSTRATUS, *Benth. Pl. Hartw. No.* 1683. Pine woods in northern California; grows in a mat on the ground.

CEANOTHUS CUNEATUS, *Nutt.; Torr. & Gray, Flor.* 1, *p.* 267. Near Fort Reading; July, in fruit.

CEANOTHUS INTEGERRIMUS, *Hook. & Arn. Bot. Beech. p.* 329; *Benth. Pl. Hartw. No.* 1684. Near Fort Reading; July, in fruit and flower.

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VITACEÆ.

VITIS CALIFORNICA, *Benth. Bot. Sulph. p.* 10, *Pl. Hartweg, No.* 1679. Banks of Sacramento river. July, in young fruit.

POLYGALACEÆ.

POLYGALA CUCULLATA, *Benth. Pl. Hartw. p.* 299. P. cornuta, *Kellogg, Proceed. Cal. Acad.* 1, *p.* 62. McCumber's Flat, northern California. Much more shrubby than Bentham's plant.

FRANKENIACEÆ.

FRANKENIA GRANDIFOLIA, *Cham. & Schlect. in Linn.* 1, *p.* 35; *Torr. & Gray, Flor.* 1, *p.* 168. Shores of San Francisco bay.

LEGUMINOSÆ.

VICIA OREGANA, *Nutt. in Torr. & Gray, Flor.* 1, *p.* 270. McCumber's, N. Cal. July, in flower. Pit river; August. Klamath basin; August, in fruit.

VICIA GIGANTEA, *Hook. Flor. Bor.-Amer.* 1, *p.* 157; *Torr. & Gray. Flor. l. c.* Near San Francisco; April, in flower.

VICIA AMERICANA, *Muhl. in Willd. sp.* 3, *p.* 1096; *Pursh. Flor.* 2, *p.* 471; *Torr. & Gray, Flor.* 1, *p.* 269. Banks of Canoe creek, N. Cal.; August, in flower.

VICIA TRUNCATA, *Nutt. in Torr. & Gray, Flor.* 1, *p.* 270. Banks of Hat creek, N. Cal.; July. Banks of Pit river; August, in flower and fruit.

TRIFOLIUM LONGIPES, *Nutt. in Torr. & Gray, Flor.* 1, *p.* 314. Fort Reading, N. Cal.; July.

TRIFOLIUM ALBOPURPUREUM, *Torr. & Gray, Flor.* 1, *p.* 313. Fort Reading, N. Cal.; July, in fruit. Specimens were presented me by Dr. J. F. Hammond, surgeon at the fort; collected in April, in flower. Plant decumbent, spreading, a foot high; silky-pubescent; heads and flowers as in the description, but plant much stronger. One of the prettiest species which I met with.

TRIFOLIUM VARIEGATUM, *Nutt.* in Torr. & Gray, Flor. 1, p. 317. Shores of San Pablo bay, California.

TRIFOLIUM TRIDENTATUM, *Lindl. Bot. Reg. t.* 1070. In Sacramento valley and at Fort Reading.

TRIFOLIUM PRATENSE, *Linn.; Torr. & Gray, Flor.* 1, *p.* 313. Fort Vancouver; introduced.

TRIFOLIUM REPENS, *Linn.; Eng. Bot. t.* 1769. Fort Vancouver, W. T.; introduced.

TRIFOLIUM FIMBRIATUM, *Lindl. Bot. Reg. t.* 1070; *Hook. Flor. Bor.-Amer.* 1, *p.* 133. McCumber's, N. Cal.; July.

LUPINUS NANUS, *Dougl.; Benth. in Hort. Trans. p.* 459, *t.* 14, *fig.* 2; *Pl. Hartw. p.* 303. Shores of San Pablo bay, California.

LUPINUS MICRANTHUS, *Dougl.; Agardh, in Bot. Reg. t.* 1251; *Torr. & Gray, Flor.* 1, *p.* 373.

LUPINUS ALBIFRONS, *Benth. in Hort. Trans. p.* 410; *Torr. & Gray, Flor.* 1, *p.* 377; *Lindl. Bot. Reg. t.* 1642.

LUPINUS LATIFOLIUS, *Agardh; Torr. & Gray, Flor.* 1, *p.* 375; *Lindl. Bot. Reg. t.* 1642.

LUPINUS POLYPHYLLUS, *Lindl. Bot. Reg. t.* 1097; *Hook. Flor. Bor. Amer.* 1, *p.* 164. Moist places at McCumber's, and about the Klamath lakes.

LUPINUS ORNATUS, *Dougl. in Bot. Reg. t.* 1216; *Torr. & Gray, Flor.* 1, *p.* 378. Banks of Pit river.

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LUPINUS LEPIDUS, *Dougl. in Bot. Reg. t*, 1149; *Torr. & Gray, Flor.* 1, *p.* 374. Banks of Hat creek, California.

LUPINUS MACROCARPUS, *Hook. & Arn. Bot. Beech. p.* 138. About San Francisco, California. Shrubby; flowers verticillate.

LUPINUS LEUCOPHYLLUS, *Lindl. Bot. Reg. t.* 1124; *Torr. & Gray, Flor.* 1, *p.* 379. Dalles of the Columbia.

THERMOPSIS MACROPHYLLA, *Hook. & Arn. Bot. Beech. p.* 329; *Torr. & Gray, Flor.* 1, *p.* 388.

HOSACKIA BICOLOR, *Dougl.; Benth. in Bot. Reg. t.* 1257; *Torr. & Gray, Flor. N. Amer.* 1, *p.* 323. Shores of San Pablo bay.

HOSACKIA PURSHIANA, *Benth. Pl. Hartweg.* No. 1701; *Torr. & Gray, Flor. N. Amer.* 1, *p.* 325. Upper Sacramento valley and McCumber's, N. Cal.; common.

HOSACKIA OBLONGIFOLIA, *Benth. Pl. Hartweg. p.* 305. Upper cañon of Pit river.

HOSACKIA DECUMBENS, *Benth. in Linn. Trans.* 17, *p.* 346; *Torr. & Gray, Flor.* 1, *p.* 323.

HOSACKIA SUBPINNATA, *Benth. Pl. Hartweg. l. c.; Torr. & Gray, Flor.* 1, *p.* 326. Petaluma, California.

HOSACKIA GRACILIS, *Benth. in Linn. Trans.* 17, *p.* 365; *Torr. & Gray, Flor.* 1, *p.* 323. San Francisco, California.

GLYCYRRHIZA LEPIDOTA, *Nutt. Gen.* 2, *p.* 106; *Torr. & Gray, Flor.* 1, *p.* 297; *Hook. Flor. Bor.-Amer.* 1, *p.* 138. McCumber's and Pit river, California; July.

ROSACEÆ.

NUTTALLIA CERASIFORMIS, *Torr. & Gray, in Hook. & Arn. Bot. Beechy, p.* 336, *t.* 82; *Torr. & Gray, Flor.* 1, *p.* 412, *Benth. Pl. Hartw. No.* 1707.

GEUM MACROPHYLLUM, *Willd. Enum.* 1, *p.* 557; *DC. Prodr.* 2, *p.* 550; *Torr. & Gray, Flor.* 1, *p.* 421. McCumber's, N. California.

SPIRAEA CÆSPITOSA, *Nutt. Torr. & Gray, Flor. N. Amer.* 1, *p.* 418; *Gray, Pl. Fendl. p.* 40. Crater pass, Cascade mountains; latitude 44°, altitude 6,700 feet.

SPIRAEA DOUGLASII, *Hook. Flor. Bor.-Amer.* 1, *p.* 172; *Torr. & Gray, Flor.* 1, *p.* 415. McCumber's, N. California.

SPIRAEA BETULIFOLIA, *Pallas, Flor. Ross. t.* 16; *Torr. & Gray, Flor.* 1, *p.* 414; *Hook, Flor. Bor.-Amer.* 1, *p.* 172. Cascade mountains, O. T.

SPIRAEA OPULIFOLIA, *Linn.*; *Torr. & Gray, Flor.* 1, *p.* 413. Banks of Mpto-ly-as river, O. T.

SPIRAEA ARIÆFOLIA, *Smith, in Rees. Cyclop.; Hook. Flor. Bor.-Amer.* 1, *p.* 173. Fort Vancouver and Cascade mountains, O. T.

RUBUS NUTKANUS, *Mocino; Hook. Flor. Bor.-Amer.* 1, *p.* 183; *Torr. & Gray, Flor.* 1, *p.* 450. McCumber's pass, N. California.

RUBUS MACROPETALUS, *Dougl. in Hook. Flor. Bor.-Amer.* 1, *p.* 78, *t.* 59; *Torr. & Gray, Flor.* 1, *p.* 457. Near San Francisco, California.

RUBUS PEDATUS, *Smith; Hook. Flor. Bor.-Amer.* 1, *p.* 181, *t.* 62; *Torr. & Gray, Flor.* 1, *p.* 452. On the coast above San Francisco, California.

RUBUS URSINUS, *Cham. & Schlecht, in Linnœa*, 2, *p.* 11. Petaluma.

RUBUS SPECTABILIS, *Pursh. Flor.* 1, *p.* 348, *t.* 16; *Hook. Flor. Bor.-Amer.* 1, *p.* 178. On the banks of the Columbia, and on the coast of Oregon generally.

COMARUM PALUSTRE, *Linn.; Fl. Dan.* 636. McCumber's, California, and Klamath basin.

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POTENTILLA ANSERINA, *Linn. Sp.* 1, *p.* 495; *Torr. & Gray, Flor.* 1, *p.* 444. Shores of Klamath lake, O. T.

POTENTILLA FLABELLIFOLIA, *Hook.; Torr. & Gray, Flor. p.* 442. Cascade mountains, O. T.; altitude 6,000 feet.

POTENTILLA GRACILIS, var. FLABELLIFORMIS, *Torr. & Gray, Flor. p.* 440. McCumber's, N. California, and Klamath basin.

POTENTILLA RIGIDA, *Nutt. in Jour. Acad. Philad.* 7, *p.* 20. Banks of Hat creek, N. California.

POTENTILLA GLANDULOSA, *Lindl. Bot. Reg. t.* 1583; *Hook & Arn. Bot. Beech., p.* 338. Banks of Hat creek, N. California.

IVESIA, Nov. Gen. (Torr. & Gray.)

"Calyx 5-fidus et 5-bracteolatus, tubo concavo vel campanulato. Petala 5, oblongo-cuneata vel obcordata, decidua. Stamina 20, bi–triseriata, tubo calycis, vel tantum 5 margini disci tenuis, inserta; filamenta filiformia vel subulato-filiformia, persistentia. Ovaria plura vel plurima, receptaculo conico villoso insidentia: ovulo pendulo: stylus infra-apicalis, gracilis, articulatione deciduus: stigma simplex. Achenia lævia. Radicula supera. Herbæ Horkeliæ facie, plurifoliolatæ, albi floræ, in sectionibus 2 disponendæ, nempe:—

"§ 1. HORKELIOIDES. Perennes, e caudice crasso confertissime multifoliolatæ; floribus congestis subsessilibus; calycis 5-fidi tubo campanulato vel turbinato; petalis spathulatis parvulis; acheniis lævibus paucis (ovariis 6–12?) Species duo: I. GORDONI, (Horkelia Gordoni, *Hook. Kew. Jour. Bot.* 5, *p.* 341, *t.* 12, H.? multifoliolata, *Torr. in Sitgreaves, Zuñi Exped. p.* 159.) I. PICKERINGII, N. California; *Coll. Expl. Exped.*

"§ 2. POTENTILLOIDES. Annuæ, laxe plurifoliolatæ, laxifloræ, pedunculis ebracteatis; calyce concavo (bracteolis conformibus) subæqualiter fere 10-partito; acheniis plurimis grosse paucicostatis. Sp. 1, nempe:

"I. GRACILIS, (sp. nov.): gracilis, laxe villosa; foliis radicalibus 11–21-foliolatis; foliolis inferioribus 3–5-partitis breviter petiolulatis, summis plerumque alte bifidis subconfluentibus, segmentis lineari seu oblongo-spathulatis, caulinis parvis cum foliolis 5–9 subintegris; floribus parvis in cyma effusa sparsis; pedunculis ebracteatis filiformibus mox cernuis; petalis obcordatis calyce longioribus; stylis inferne vesiculoso-subincrassatis.—Banks of Rhett lake, one of the Klamath group. A foot high, producing many slender and nearly erect stems from a slender and evidently annual root. Leaflets thin, 3 to 6 lines long, irregular, often alternate, the lower ones rather sparse. Branches of the open cyme, as well as the peduncles, very slender; the latter fully an inch long. Flowers very small; the calyx, when spread out flat, only about 4 lines wide, flattish, and open like that of a Potentilla; the accessory lobes like the real sepals, only slightly smaller and blunter. Petals white, broad, deciduous. Stamens 20, in three ranks, five of them, viz: those opposite the true sepals inserted on the margin of a narrow and thin patelliform perigynous disk, (which is villous, like the receptacle it surrounds,) the others borne on the face of the calyx, the five opposite the petals inserted very close to the disk, but distinguishably separate from it; the remaining ten inserted higher up, just below the 10 sinuses, and answering to them, but in reality borne one on each side of the base of each interior or true division of the calyx; the persistent filaments slightly dilated at the base. Receptacle conical, hirsute. Ovaries indefinite, 30 or more, inserted by the inner angle just above the base; the style inserted a little below the rounded apex by a narrow base, above which it is more or less enlarged and glandular, or rather vesicular, and tapering gradually to

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the apex, tipped with a simple stigma. Achenia pretty numerous, smooth, glabrous; when mature marked by a few thick and irregular longitudinal ribs; the style deciduous by an articulation. Seed suspended from near the summit.

"Although so well marked by the characters above cited, this plant and the two of the proposed first section evidently belong to the same genus, and that intermediate between Horkelia and Potentilla. The first section is more like Horkelia, from which the 20 stamens with filiform filaments (instead of 10 with broad or deltoid filaments) distinguish it. The second, except as to the foliage, resembles Potentilla, but is distinguished by its definite stamens in three ranks, &c. Dr. Torrey indicated the essential characters of this genus several years ago, but allowed the two species then known to him to be provisionally appended to Horkelia. Dr. Newberry's discovery, however, renders it necessary to complete the separation. The present name is chosen to commemorate one of the oldest surviving botanists of the United States, the venerable Dr. Eli Ives, formerly professor of materia medica and pharmacy in Yale College, who, although he has published little directly upon botany, has rendered excellent service as a teacher of the science to a long series of pupils." *A. Gray.*

Plate XI. IVESIA GRACILIS. Plant of the natural size. Fig. 1. A flower. 2. A petal. 3. Section of receptacle, calyx, &c. 4. Flower spread out flat, to show the insertion and arrangement of the stamens; the ovarian receptacle cut wholly away. 5. A pistil. 6. The receptacle in fruit vertically divided. 7. A ripe achenium. 8. The same vertically divided. All the details more or less magnified.

HORKELIA CUNEATA, *Lindl.; Torr. & Gray, Fl.* 1, *p.* 435. Shores of Klamath lake.

HORKELIA CONGESTA, *Hook.; Torr. & Gr. Flor.* 1, *p.* 434. Banks of Hat creek, northern California.

FRAGARIA CALIFORNICA, *Cham. & Schlecht. in Linnœa*, 2, *p.* 20; F. Chilensis, *Torr. & Gray, Flor.* 1, *p.* 448, *in part.* Willamette valley.

FRAGARIA CHILENSIS, *Ehrh.; Torr. & Gray, Flor.* 1, *p.* 448. Portland, Oregon; November 1, in flower.

ROSA FRAXINÆFOLIA, *Borr.; Lindl. Bot. Reg., t.* 458; *Hook. Flor. Bor.-Amer.* 1, *p.* 199. Common in northern California and Oregon.

PYRUS RIVULARIS, *Dougl. in Hook. Flor. Bor.-Amer.* 1, *p.* 203, *t.* 68; *Torr. & Gray, Flor.* 1, *p.* 471; *Nutt. Sylv.* 2, *p.* 22, *t.* 49. Pit river, northern California.

PYRUS AMERICANA, *DC. Prod.* 2, *p.* 637; *Torr. & Gray, l. c.* Cascade mountains, O. T.

CERASUS MOLLIS, *Dougl. in Hook. Flor. Bor.-Amer.* 1, *p.* 169. On Pit river and in Cascade mountains.

CERASUS DEMISSA, *Nutt. in Torr. & Gray, Fl.* 1, *p.* 411. Common in mountains throughout northern California and Oregon.

PRUNUS SUBCORDATA, *Benth. Pl. Hartw.* No. 1710. Sierra Nevada, near Lassen's butte; Klamath lakes, August, in fruit; fruit large, excellent.

AMELANCHIER CANADENSIS, var. ALNIFOLIA, *Torr. & Gray, Flor.* 1, *p.* 473. Amelanchier alnifolia, *Nutt. Jour. Acad. Phil.* 7, *p.* 22.

CHAMÆBATIA FOLIOLOSA, *Benth. Plant., Hartweg.* No. 1712; *Torrey, Pl. Frêmont, p.* 11, *t.* 6. Banks of Canoe creek, July 30, in flower; a very handsome plant, and well worth an effort for its cultivation.

CALYCANTHACEÆ.

CALYCANTHUS OCCIDENTALIS, *Hook. & Arn. Bot. Beech. p.* 340, *t.* 84. Sacramento valley.

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ONAGARACEÆ.

CLARKIA ELEGANS, *Lindl.; Torr. & Gray, Flor.* 1, *p.* 515. McCumber's, N. California; July 29.

EPILOBIUM ALPINUM, var. ALSINIFOLIUM, *Vill.*; *Torr. & Gray, Flor.* 1, *p.* 489. Crater pass, Cascade mountains, Oregon Territory.

EPILOBIUM ANGUSTIFOLIUM, *Linn.* In pine woods, passim. Northern California and Oregon.

EPILOBIUM PANICULATUM, *Nutt.; Torr. & Gray, Flor.* 1, *p.* 490. Sacramento valley, Columbia and Klamath basin, Oregon Territory; July and August.

EPILOBIUM COLORATUM, *Muhl.* Banks of Canoe creek, northern California; July.

ŒNOTHERA DENSIFLORA, *Lindl.* Banks of Pit river, California; July 30.

ŒNOTHERA BIENNIS, var. CANESCENS, *Gray.* Banks of Canoe creek, northern California; August 2.

ŒNOTHERA TRICHIOCALYX, *Nutt.; Torr. & Gray, Flor.* 1, *p.* 494. Lost river, Klamath basin, Oregon Territory; August 4.

ŒNOTHERA TANACETIFOLIA, *Torr. & Gray, in Beckwith's Railroad Report, p.* 121, *t.* 4. A variety with less dissected foliage. Shores of Rhett lake.

GROSSULACEÆ.

RIBES MENZIESII, *Pursh, Fl.* 2, *p.* 732; *Torr. & Gray, Fl.* 1, *p.* 545. San Francisco, California.

RIBES DIVARICATUM, *Dougl. in Hort. Trans.* 7, *p.* 515. Hell valley, along streams.

RIBES VISCOSISSIMUM, *Pursh, Fl.* 1, *p.* 163; *Torr. & Gray, Fl.* 1, *p.* 551. Fruit blue. Cascade mountains. Forks of trees.

RIBES SPECIOSUM, *Pursh, Fl.* 2, *p.* 732; *DC. Prod.* 3, *p.* 478; *Torr. & Gray, Flor.* 1, *p.* 545. Near San Francisco.

RIBES GLUTINOSUM, *Benth. Hort. Trans.* (*new ser.*) 1, *p.* 476. San Francisco.

RIBES LACUSTRE, *Poir.; Pursh, Fl.* 1, *p.* 165. Cascade mountains. Fruit black, racemed.

RIBES SANGUINEUM, *Pursh, Flor.* 1, *p.* 164. Common in California and Oregon.

CUCURBITACEÆ.

MEGARRHIZA CALIFORNICA, *Torrey.* Petaluma and Sonoma, California; April, in flower.

MEGARRHIZA OREGANA, *Torrey.* On the shores of Klamath lake and banks of Willamette river, O. T.; August and September, in fruit.

CRASSULACEÆ.

SEDUM STENOPETALUM, *Pursh, Flor.* 1, *p.* 234; *Torr. & Gray, Flor.* 1, *p.* 560. Cascade mountains.

SEDUM SPATHULIFOLIUM, *Hook; Torr. & Gray, Flor.* 1, *p.* 559. Port Orford, O. T.

ECHEVERIA LANCEOLATA, *Nutt. in Torr. & Gray, Flor.* 1, *p.* 561. Cascade mountains, O. T.

SAXIFRAGACEÆ.

TIARELLA UNIFOLIOLATA, *Hook. Flor. Bor.-Amer.* 1, *p.* 238, *t.* 81. Spruce forests, Cascade mountains, O. T.

MITELLA PENTANDRA, *Hook. l. c.* 1, *p.* 241. With the last.

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HEUCHERA CYLINDRICA, *Dougl.; Hook.* 1, *p.* 236. Cascade mountains, O. T.

SAXIFRAGA TOLMÆI, *Torr. & Gray, Flor. N. Amer. p.* 567. Crater pass, Cascade mountains, O. T.; altitude, 6,800 feet.

SAXIFRAGA PELTATA, *Torrey, Bot. Expl. Exped. ined.; Benth. Plant. Hartweg,* No. 1740.

SAXIFRAGA INTEGRIFOLIA, *Hook. Flor. Bor.-Amer.* 1, *p.* 249, *t.* 86. Shores of Klamath lake.

UMBELLIFERÆ.

CONIOSELINUM CANADENSE, *Torr. & Gray, Flor. N. Amer.* 1, *p.* 619. Crater Pass, Cascade mountains, O. T.

EDOSMIA GAIRDNERI, *Nutt.; Torr. & Gray, Flor.* 1, *p.* 612. Fort Reading and McCumber's, N. California.

SANICULA BIPINNATIFIDA, *Dougl.; Hook. Flor. Bor.-Amer.* 1, *p.* 358, *t.* 92. Common throughout the Sacramento valley, California.

SANICULA LACINIATA, *Hook. & Arn. Bot. Beechey, Suppl. p.* 347. Petaluma, California.

ERYNGIUM ARTICULATUM, *Hook. Jour. Bot.* Common in northern California.

CYMOPTERUS TEREBINTHINUS, *Nutt.; Hook. Fl. Bor.-Am.* 1, *p.* 266, *t.* 95. Crater pass, Cascade mountains, O. T.

PEUCEDANUM TRITERNATUM, *Nutt.; Jour. Acad. Philad.* 7, *p.* 27; *Hook. Fl. Bor.-Am.* 1, *p.* 204, *t.* 94. Fort Reading, Cal.

PEUCEDANUM FŒNICULACEUM, *Nutt.; Torr. & Gray, Flor.* 1, *p.* 627. Crater pass, Cascade mountains.

PEUCEDANUM UTRICULATUM, *Nutt.; Torr. & Gray, Flor.* 1, *p.* 628. San Francisco, California.

PEUCEDANUM CARUIFOLIUM, *Nutt.; Torr. & Gray, Flor.* 1, *p.* 628. Shores of San Pablo bay, California.

OSMORRHIZA NUDA, *Torr. in Whipple's Report, ined.* Crater pass, Cascade mountains, Cal.

HYDROCOTYLE AMERICANA, *Linn; Torr. & Gray, Flor.* 1, *p.* 599. San Francisco, Cal.

CORNACEÆ.

CORNUS NUTTALLII, *Nutt. Sylv.* 3, *p.* 52; *Torr. & Gray, Flor.* 1, *p.* 652. The fruit of this species is quite different from that of *C. florida*, the berries being so densely glomerated as to form a solid spherical capitulum, precisely as in the genus *Benthamia*, which is, therefore, scarcely distinguishable from *Cornus*, and will perhaps not stand.

CORNUS CANADENSIS, *Linn.; Torr. & Gray, Flor.* 1, 652. Cascade mountains, O. T.

CORNUS STOLONIFERA? *Michx.; Torr. & Gray, Flor.* 1, 650. Cascade mountains, O. T.

CORNUS PUBESCENS, *Nutt. Sylva* 3, *p.* 54. Cascade mountains, O. T.

CAPRIFOLIACEÆ.

LONICERA CŒRULEA, *Linn.; Torr. & Gray, Flor.* 2, *p.* 9. Des Chutes basin, O. T.; September 1.

LONICERA INVOLUCRATA, (*Herb. Banks,*) *DC. Prodr.* 4, *p.* 336; *Torr. & Gray, Flor.* 2, *p.* 9. Cascade mountains, O. T.

LONICERA CALIFORNICA, *Torr. & Gray, Flor.* 2, *p.* 7. San Antonio, Dr. Andrews.

LONICERA HISPIDULA, *Dougl. Mss.; Torr. & Gray, Flor.* 2, *p.* 8. Placerville, California.

SAMBUCUS PUBENS, *Michx.*; *Michx. Fl.* 1, *p.* 181. Cascade mountains, O. T.

SAMBUCUS MEXICANA, *Pres. in DC. Prodr.* 4, *p.* 323; *Gray, Pl. Wright,* 2, *p.* 66. Klamath basin and Cascade mountains, O. T.

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SYMPHORICARPUS RACEMOSUS, *Michx. Fl.* 1, *p.* 107. Northern California and Cascade mountains, O. T.

LINNEA BOREALIS, *Gronov.; Linn. Sp. Pl. p.* 880; *Hook. & Arn. Bot. Beech. Voy.* 1, *p.* 125. Cascade mountains, O. T.

RUBIACEÆ.

GALIUM APARINE, *Linn.; Pursh. Fl.* 1, *p.* 103; *Torr. & Gray, Flor.* 2, *p.* 20. Klamath lake and Dalles of Columbia.

GALIUM CALIFORNICUM, *Hook. & Arn. Bot. Beechey, Suppl. p.* 349. Petaluma; April, in flower.

GALIUM BOREALE, *Linn.; Hook. Flor. Bor.-Am.* 1, *p.* 289. Shores of Klamath lake, O. T.

GALIUM RUBIOIDES, *Linn. Spec.* 1, *p.* 105; *DC. Prod.* 4, *p.* 599; *Hook. & Arn. Bot. Beech. Voy., p.* 115; *Hook. Flor. Bor.-Amer.* 1, *p.* 289. Cascade mountains, O. T.

GALIUM ASPRELLUM, *Michx. Fl.* 1, *p.* 78; *Pursh, Fl.* 1, *p.* 103; *Torrey, Fl.* 1, *p.* 166. Banks of Canoe creek, northern California; July 29.

CEPHALANTHUS OCCIDENTALIS, *Linn.; Michx. Fl.* 1, *p.* 87. Common in Sacramento valley.

VALERIANACEÆ.

PLECTRITIS CONGESTA, *DC. Prod.* 4, *p.* 631. Shores of San Pablo and bay, California.

VALERIANA SYLVATICA, *Banks; Hook. Flor. Bor.-Am.* 1, *p.* 291. Crater pass, Cascade mountains, O. T.

COMPOSITÆ.—(By A. GRAY.)

EUPATORIUM OCCIDENTALE, *Hook. Fl. Bor. Am.* 1, *p.* 305; *Torr. & Gray, Fl.* 1, *p.* 91. On rocks, Canoe creek, northern California; a low shrubby plant.

LESSINGIA GERMANORUM, *Cham.; Torr. & Gray, l. c.* 2, *p.* 451. Upper Sacramento valley.

LESSINGIA VIRGATA, *Gray, in Pl. Hartw. p.* 315; McCumber's. This very remarkable species was known only by a specimen in the collection of the United States Pacific Exploring Expedition, with which Dr. Newberry's plant well accords.

ASTER SALSUGINOSUS, *Richards.; Torr. & Gray, Fl.* 2, *p.* 155. Crater pass.

ASTER ADSCENDENS, *Lindl. in Hook. l. c. & DC. Prodr.* 5, *p.* 231.

ASTER NOVI BELGII, *Linn.* Upper Des Chutes; also a dwarf state at the Dalles.

ASTER SIMPLEX, *Willd.? Torr. & Gray, l. c.* Upper Des Chutes river.

ASTER FALCATUS, *Lindl.; Torr. & Gray, l. c.* Klamath lake.

ERIGERON FILIFOLIUM, *Nutt.; Torr. & Gray, Fl.* 2, *p.* 177. Cascade mountains, Oregon; flowers white and pink.

ERIGERON DOUGLASII, *Torr. & Gray, l. c.;* var. foliis latioribus, capitulis (immaturis) minoribus. Apparently the E. foliosum of Nuttall. McCumber's, Upper Sacramento.

ERIGERON CANADENSE, *Linn.* Common in California and Oregon.

HULSEA NANA, (sp. nov.): humilis; foliis pinnatifidis; pedunculo scapiformi monocephalo; involucri squamis oblongo-lanceolatis subacutis; floribus luteis; pappi paleis fimbricato-laceris.—(Tab. XII.) In beds of scoria, at the line of perpetual snow, Crater pass, Cascade mountains, lat. 44° 10′, September. This is one of the most interesting plants of Dr. Newberry's collection, and I have great pleasure in proposing that the species shall bear his name. It opportunely confirms a genus, still unpublished, (but likely soon to be given to the world,) which I characterized two years ago in manuscript, and which was founded on a single specimen of a stem or peduncle, destitute of foliage, but bearing several heads. The floral characters

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forbid us to refer it to any known genus, and it was, therefore, dedicated to Dr. G. W. Hulse, of Louisiana, a zealous cultivator of botany, who gathered it in the mountains of the southern part of California, back of San Diego, and sent the specimen to his friend and correspondent, Dr. Torrey. The characters of the genus, and the distinctive marks (so far as known) of the original species, are here appended. The present plant is only three or four inches high, excluding the slender shoot or root-stock, which rises through the loose scoria in which it grows.

HULSEA, *Torr. & Gray, in Bot. Mex. Bound. Surv. ined.* Capitulum multiflorum, radiatum; floribus radii ligulatis fœmineis, disci tubulosis. Involucrum hæmisphericum; squamis subtriseriatis membranaceis laxis, exterioribus paulo brevioribus. Receptaculum planum epaleaceum, alveolato-dentatum; dentibus brevibus corneis. Ligulæ 20–30, lineares. Corollæ fl. hermaph. tubo gracili viscoso-glanduloso, fauce cylindracea, limbo 5-dentato, dentibus tringulariovatis fere glabris. Antheræ ecaudatæ. Styli rami obtusi, longitrorsum puberuli, exappendiculati. Achenia conformia, linearia, subtetragono-compressa, deorsum attenuata, villosa præsertim ad margines. Pappus (villis achenii vix longior) e paleis 4 tenuibus hyalinis enerviis latis obtusissimis erosis vel fimbriatis. Herbæ perennes, viscoso-pubescentes, macrocephalæ, alternifoliæ; caule florifero subaphyllo; floribus flavis.

1. H. CALIFORNICA: elata; caule vel pedunculo 3–7 cephalo; involucri squamis linearibus apice attenuatis; floribus aureis; pappi paleis cuneato-rotundis apice truncato eroso-denticulatis.

2. H. NANA: Vide supra.

Plate XII, HULSEA NANA. Plant of the natural size. Fig. 1, a ray flower; 2, a disk flower; 3, corolla of the last laid open, the stamens, &c., displayed; 4, some of the glandular hairs on the corolla; 5, branches of the style of the disk flowers; 6, paleæ of the pappus; 7, section of a mature achenium; 8, the receptacle. The details variously magnified.

COREOPSIS ATKINSONIANA, *Dougl. Bot. Reg. t.* 1376. Rocks on the Oregon river.

GAILLARDIA ARISTATA, *Pursh, Fl.* 2, *p.* 573. Fort Dalles, Oregon river.

CHÆNACTIS DOUGLASII, *Hook. & Arn. Bot. Beech. p.* 354, (to which C. achilleæfolia is to be joined.) Klamath lake. Flowers white.

BAHIA LEUCOPHYLLA, *DC. Prodr.* 5, *p.* 656. McCumber's, Upper Sacramento valley.

BAHIA LANATA, *Nutt.; DC. l. c.* & var. TENUIFOLIA. With the last, &c.

BURRIELIA TENERRIMA, *DC. Prodr.* 5, *p.* 663. Sonoma.

DICHÆTA ULIGINOSA, *Nutt. in Trans. Amer. Phil. Soc.* 7, *p.* 383. With the last.

HELENIUM AUTUMNALE, *Linn.* var. GRANDIFLORUM, *Torr. & Gray.* Klamath lake and Willamette river.

SOLIDAGO GIGANTEA, *Ait.; Hook. Flor. Bor.-Am.* 2, *p.* 2. Banks of Columbia river, O. T.

SOLIDAGO CONFERTIFLORA, *Nutt.; Hook. Flor. Bor.-Am.* 2, *p.* 4. Klamath basin, O. T.

SOLIDAGO ELONGATA, *Nutt.* var. McCumber's, Upper Sacramento.

LINOSYRIS GRAVEOLENS, *Torr. & Gray, Fl.* 2, *p.* 234. Banks of upper Pit river.

CHRYSOPSIS VILLOSA, *Nutt. Gen.* 2, *p.* 150. Cascade mountains; a small form.

BLENNOSPERMA CALIFORNICUM, *Torr. & Gray, Fl.* 2, *p.* 272. Sacramento valley.

WYETHIA HELENIOIDES, *Gray, Pl. Fendl. p.* 82, *adn.;* var. capitulo multum minore. Near McCumber's, on the upper Sacramento. The foliage and aspect accord with W. helenioides, but the head is only one-quarter the size. The single one gathered, however, is from an axillary shoot, the terminal one being destroyed or lost, and it is not in a condition to permit an

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examination of the flowers. The plant may, therefore, for the present, remain appended to W. helenioides.

WYETHIA ROBUSTA, *Nutt. in Trans. Amer. Phil. Soc.* 7, *p.* 351; *Torr. & Gray, Fl.* 2, *p.* 299, *excl. syn.* With the last. Radical leaves lanceolate, a foot long. Not well named, as the stems are quite slender next the ground. They bear, in a crowded manner, many alternate and pinnatifid leaves of oblong or spatulate outline, tapering into a margined petiole. The leaves, including the petiole, are one or two inches long; their lobes one to three lines long, oblong, obtuse, entire or obtusely toothed. Like the rest of the plant, they are viscid or glandular-pubescent. A solitary peduncle, 1½ inch long, bears a single head, which is nearly an inch in diameter. Involucre purplish; the outer scales broadly oblong-lanceolate; the inner lanceolate. Rays small, linear, about 20 in number, apparently light yellow, half an inch long. Its tube and the lower part of the disk-corollas beset with glandular hairs. Achenia 3 to 4 lines long, flat, blackish, softly and very villous, except perhaps towards the base; the hairs at the summit as long as the diaphanous paleæ of the pappus.

OXYURA CHRYSANTHEMIOIDES, *DC. Prodr.* 5, *p.* 693. Petaluma, California.

LAYIA CALLIGLOSSA, *Gray, Pl. Fendl. p.* 103; var.? OLIGOCHÆTA; pappi aristis 2–3. Petaluma, California.

MADARIA ELEGANS, *DC. Prodr.* 5, *p.* 692. McCumber's.

LAGOPHYLLA FILIPES, *Gray, in Mex. Bound. Surv.* Hemizonia filipes, *Hook. & Arn. Bot. Beech. p.* 356. With the last, in flower only. Fruiting specimens of this are still a desideratum.

ACHILLEA MILLEFOLIUM, *L.* McCumber's, shores of Klamath lake, &c.

MATRICARIA DISCOIDEA, *DC. Prodr.* 6, *p.* 51. Petaluma.

ARTEMISIA TRIDENTATA, *Nutt.* Columbia river.

ARTEMISIA LUDOVICIANA, *Nutt.; var.* GNAPHALIOIDES, *Torr. & Gray, Fl.* 2, *p.* 420. Pit river.

ARTEMISIA DRACUNCULOIDES, *Pursh.* Des Chutes basin.

GNAPHALIUM LUTEO-ALBUM, *Linn.* (G. Sprengelii, *Hook. & Arn.*, in part.) Sonoma.

GNAPHALIUM PALUSTRE, *Nutt.; Torr. & Gray, Fl.* 2, *p.* 427. Canoe creek.

GNAPHALIUM PURPUREUM, *L.* Petaluma.

ANTENNARIA GEYERI, *Gray, Pl. Fendl. adn. p.* 107. McCumber's. These are fine specimens of the male plant of this rare species, which Sir William Hooker confounded with a South American Gnaphalium, (G. alienum, *Hook. & Arn.*) But it is a true Antennaria.

ANTENNARIA LUZULOIDES, *Torr. & Gray, Fl.* 2, *p.* 431. Hat creek and McCumber's, N. Cal.

ANTENNARIA MARGARITACEA, *R. Br.* Lakes south of Crater pass, Cascade mountains, O. T.; August.

SENECIO TRIANGULARIS, *Hook. Fl. Bor.-Amer.* 1, *p.* 322, *t.* 115. Upper Des Chutes river, near the edge of the water; September.

ARNICA CHAMISSONIS, *Less.; Torr. & Gray, Fl.* 2, *p.* 449. A narrow-leaved state; shores of Klamath lake, O. T.

ARNICA MOLLIS, *Hook.; Torr. & Gray, l. c.* Crater pass, near the snow line. A state with narrower leaves than usual, and tapering to the base.

TETRADYMIA CANESCENS, *DC. Prodr.* 6, *p.* 440. Fort Reading, Cal. The leaves are only a little shorter than in Douglas' plant, and the flowering branches (which are herbaceous from a shrubby base) are nearly as slender.

STEPHANOMERIA MINOR, *Nutt.; Torr. & Gray, Fl.* 2, *p.* 472. Hat creek and Pit river, Cal.

STEPHANOMERIA VIRGATA, *Benth. Bot. Sulph. p.* 32. A much larger flowered variety, but

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specimens gathered by Frémont approach it. The admitted species are probably too numerous already. McCumber's, N. Cal.

MACRORHYNCHUS LACINIATUS, *Torr. & Gray, l. c.* Crater pass.

MACRORHYNCHUS LESSINGII, *Hook. & Arn.?* McCumber's and Canoe creek, N. Cal.

MULGEDIUM PULCHELLUM, *Nutt.; Torr. & Gray, l. c. p.* 497. Bartee's valley, N. Cal.

XANTHIUM STRUMARIUM, *Linn.; DC. Prodr.* 5, *p.* 523. Common throughout N. California and Oregon.

LEUCANTHEMUM VULGARE, *Lam.* Fort Vancouver, W. T. (Introduced.)

HEMIZONIA PUNGENS, *Torr. & Gray, Fl.* 2, *p.* 399. Sacramento valley, Cal.

HEMIZONIA MACRADENIA, *DC.; Torr. & Gray, l. c.* Fort Reading, Cal.

MARUTA COTULA, *DC.* Marysville, California.

BIDENS CHRYSANTHEMOIDES, *Michx.; Pursh. Fl.* 2, *p.* 566. San Francisco and Sacramento valley, Cal.

CAMPANULACEÆ.

SPECULARIA PERFOLIATA, *A. DC.* Fort Vancouver, W. T.

DOWNINGIA ELEGANS, *Torr. in Whipple's Report, (ined.)* Bartee's valley, N. Cal.; August.

GITHOPSIS CALYCINA, *Benth. Plant. Hartweg. p.* 321. Fort Reading, Cal.

CAMPANULA SCOULERI, *Hook. Flor. Bor.-Amer.* 2, *p.* 28, *t.* 125. A small form, Cascade mountains, O. T.; larger form, McCumber's, N. Cal.

ERICACEÆ.

ARCTOSTAPHYLOS TOMENTOSA, *Dougl. in Lind. Bot. Reg. Hook. Flor. Bor.-Amer.* 2, *p.* 37, *t.* 130. Cascade mountains, O. T., latitude 44°.

ARCTOSTAPHYLOS GLAUCA, *Lindl. Bot. Reg. t.* 1791, Xerobotrys glaucus, *Nutt. Trans. A . Philos. Soc.* Common throughout northern California and southern Oregon.

ARCTOSTAPHYLOS UVA-URSI, *Spreng., Pursh Fl.* 1, *p.* 283. Pine woods, N. California and Cascade mountains.

ARBUTUS MENZIESII, *Pursh Flor.* 1, *p.* 282. N. California, Cascade mountains and Willamette valley, O. T.

AZALEA CALIFORNICA, *Torr. & Gray.* A. calendulacea, *Hook. & Arn. Bot. Beech. p.* 362. Fort Reading, N California.

MENZIESEA EMPETRIFORMIS, *Smith; Hook. Flor. Bor.-Amer.* 2, *p.* 40. Crater pass, Cascade mountains; altitude 6,000—7,000 feet.

GAULTHERIA SHALLON, *Pursh; Hook. Flor. Bor.-Amer. p.* 2, 36. Cascade mountains and Coast Range, Willamette valley, O. T.

GAULTHERIA MYRSINITES, *Hook. Flor. Bor.-Amer.* 2, *p.* 35, *t.* 129. Cascade mountains, O. T.; altitude 6,000 feet.

KALMIA GLAUCA, *Ait.; Hook. Flor. Bor.-Amer.* 2, *p.* 41. Crater pass, Cascade mountains; altitude 6,000 feet. Sphagnous marshes, mouth of the Columbia; September 6.

RHODODENDRON ALBIFLORUM, *Hook. Flor. Bor.-Amer.* 2, *p.* 43, *t.* 133. Cascade mountains, O. T.; latitude 44°.

RHODODENDRON MAXIMUM? *Hook. Flor. Bor.-Amer.* 2, *p.* 42. Spruce forests, Cascade and Coast mountains.

VACCINIUM MACROCARPUM, *Ait.*; *Hook. Flor. Bor.-Am.* 2, *p.* 34. Marshes; mouth of Columbia river, O. T.

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VACCINIUM PARVIFOLIUM, *Smith; Hook. Bor.-Am.* 2, *p.* 33, *t.* 128. Cascade mountains, O. T.

VACCINIUM OXYCOCCUS, *Linn.; Hook. Flor. Bor.-Am.* 2, *p.* 34. Sphagnous marshes, Cascade mountains, O. T.

VACCINIUM OVALIFOLIUM, *Smith; Hook. Flor. Bor.-Am.* 2, *p.* 32, *t.* 127. Cascade mountains, O. T.

VACCINIUM MYRTILLOIDES, *Michx.; Hook. Flor. Bor.-Am.* 2, *p.* 32. Cascade mountains, O. T.

VACCINIUM OVATUM, *Pursh; Hook. Flor. Bor.-Am.* 2, *p.* 33. Cascade mountains, O. T.

VACCINIUM CÆSPITOSUM? *Michx.; Hook. Flor. Bor.-Am.* 2, p. 33, *t.* 126. Cascade mountains.

CHIMAPHILLA UMBELLATA, *Pursh; Hook. Flor. Bor.-Am.* 2, *p.* 49. N. California and Cascade mountains, O. T.

PYROLA APHYLLA, *Smith; Hook. Flor. Bor.-Am.* 2, *p.* 48, *t.* 137. Pine forests, N. California, and Cascade mountains, O. T.

PYROLA ROTUNDIFOLIA, *Linn.; Hook. Flor. Bor.-Am.* 2, *p.* 46. McCumber's, N. California.

PYROLA DENTATA, *Smith; Hook. Fl. Bor.-Am.* 2, *p.* 46, *t.* 136. var. INTEGRIFOLIA, Cascade mountains, O. T.

PYROLA MINOR, *Linn.; Hook. Flor. Bor.-Am.* 2. *p.* 45. Crater Pass, Cascade mountains; altitude 6,500 feet.

PTEROSPORA ANDROMEDEA, *Nutt.; Hook. Flor. Bor.-Am.* 2, *p.* 48. Pine woods throughout N. California and Oregon.

CASSIOPE TETRAGONA, *Don. in DC. Prod.* 7, *p.* 611. *Andromeda tetragona, Linn. Flor. Dan. t.* 1030; *Pursh. Flor. p.* 290; *Hook. Bot. Mag. t.* 3181; *Flor. Bor.-Amer.* 2, *p.* 58. Crater pass, Cascade mountains.

HEMITOMES, nov. gen. MONOTROPEARUM. (By A. GRAY.)

Calyx disepalus, bracteoliformis. Corolla tubuloso-urceolata, 4–5-loba, post anthesin marcescens, lobis patentibus intus villosulis. Stamina hypogyna, 8 vel 10: filamenta filiformia, superne barbata: antheræ basifixæ, glandula parva apiculata, dimidiatim unilocularis; nempe, loculo fertili oblongo-lineari longitrorsum dehiscente, altero ad costam billamellatam reducto. Discus nullus. Ovarium ovoideum, pseudo-quinqueloculare, nempe placentæ 4 bilamellatæ videntur, divaricatæ, et inter se coalitæ circum locellum centralem, extus intusque creberrime ovuliferæ. Stylus elongatus: stigma depressocapitatum, integerrimum, umbilicatum, pervium. Fructus ut videtur carnosus evalvis.—Rhizophytum brunneum, carnosum; caule simplici squamato; floribus sessilibus in capitulum terminale congestis bracteatis.

HEMITOMES CONGESTUM. (Plate XIII.) Upper Des Chutes valley; September.

The addition of a new genus to the small order or sub-order *Monotropeæ*, is a matter of no small interest; and this, founded on a fragmentary, but yet an adequate specimen, is the third which has come to our knowledge from the Pacific border of the United States.* The plant has much the aspect of a *Monotropa* of the section *Hypopitys;* but is remarkable for bearing its flowers in a dense, terminal, nearly hemispherical head. Each flower is subtended by a scaly bract, nearly like the scales of the stem, and about as long as the corolla. The outer flowers appear to be all tetramerous and octandrous, like the lower ones of *Hypopitys*, but some of the inner ones have a 5-lobed corolla, and, I believe, 10 stamens. A pair of narrowly-linear persistent lateral bractlets represent the calyx. The scarious-membranaceous corolla is urceolate-

* Namely, *Sarcodes* of Torrey, (which is admirably illustrated in the Plantæ Frémontianæ, p. 17, plate 10, and which was near the same time published in California by Dr. Kellogg, under the name of *Pterosporopsis,*) and *Allotropa*, the single known species of which *Allotropa virgata*, Torr. & Gray, ined. was gathered on the Cascade mountains of northern Oregon, by Dr.

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tubular in the flowers inspected, which are all much passed anthesis; it is probably more tubular at first, but is afterwards swollen out below by the enlargement of the gravid ovary. The æstivation could not be made out. The greatest peculiarity of the plant is found in the anthers, which are one-celled through obliteration; the missing cell being reduced to a narrow longitudinal ridge, almost continuous with the filament. This ridge is bipartible, if not splitting spontaneously, into two narrow lamellæ, in a manner answering well to the normally longitudinal dehiscence of the fertile cell. It may possibly even contain a few grains of pollen, but probably none.

This remarkable semi-castration has suggested the generic name.* In the total absence of a disk, and in the elongated style, our plant accords with *Sarcodes*. The pervious stigma and style and the imperfect calyx are points which connect it more closely with *Monotropa*, of which it has the general aspect. There are indications that the fruit is baccate. It is difficult to make out the structure of the ovary clearly, nor is there much material to be sacrificed in the endeavor. I think, however, that our analysis is not far wrong. If correct, we have a curious anomaly in the ovary of the present plant, namely: besides the four (or in some cases five?) normal cells, there is an axile cell equally and profusely ovuliferous throughout, and reminding one of the ovary of *Obolaria* (Chloris, Bor.-Amer. p. 21, t. 3) and of *Bartonia*, (Man. Bot. Northern United States, ed. 2, p. 347.) As will be seen from the framing of the generic character, I take this to be of the same nature as the central cavity in the ovary of *Martynia*. I trust further specimens may duly come to hand, and confirm or correct this view of the structure of the ovary.

Plate XIII. HEMITOMES CONGESTUM.—The plant of the natural size. Fig. 1. Side view of a flower and its bract. 2. Front view of a flower. 3. Stamens and pistil. 4. A detached stamen, the anther seen laterally. 5. Anther seen posteriorly; the ridge representing the aborted cell towards the eye. 6. Same seen laterally, and divided transversely. 7. Pollen. 8. Transverse slice of an ovary. 9. Vertical section through the whole pistil.

SARCODES SANGUINEA, *Torrey, Plant. Frêmont, in Smith. Contrib.* 6, *p.* 18, *t.* 10. In pine forest, base of Lassen's butte, northern California.

SCROPHULARIACEÆ.—(By A. GRAY.)

PENTSTEMON SPECIOSUS, *Dougl.; Hook. Flor. Bor. Am.* 2, *p.* 98. Banks of Canoe creek, N. Cal.; shores of Klamath lake.

Pickering and Mr. Brackenridge, in the South-Sea Exploring Expedition under Commodore Wilkes; and, finally, the present discovery of Dr. Newberry. The six genera now known may be disposed synoptically in this way:

§ 1. *Corolla monopetala.*

* *Antheræ biloculares:*

1. *Longitrorsum dehiscentes, dorso biaristatæ.*

1. PTEROSPORA, *Nutt.* Corolla ovata, 5-dentata. Semina apice alata.

2. *Apice foraminibus dehiscentes, muticæ. Corolla campanulata 5-loba.*

2. SARCODES, *Torr.* Discus nullus. Antheræ elongatæ: filamenta brevia. Stylus elongatus.

3. SCHWEINITZIA, *Ell.* Discus 10-crenatus. Antheræ breves: filamenta gracilia. Stylus brevis crassus.

** *Antheræ abortu uniloculares. Calyx imperfectus, bracteiformis.*

4. HEMITOMES, *Gray:* Vide, supra.

§ 2. *Corolla 4–5-petala. Calyx imperfectus.*

5. ALLOTROPA, *Torr. & Gray.* Petala orbiculata, basi haud gibbosa. Discus nullus. Antheræ ovatæ, biloculares, longitrorsum dehiscentes. Stylus nullus.

6. MONOTROPA, *Linn.* Petala cuneata vel spathulata, basi gibbosa vel saccata. Discus e dentibus 8–10 deflexis. Antheræ reniformes, confluentim uniloculares, transversim dehiscentes. Stylus columnaris.

[* Viz: Ἡμιτόμης, a half-eunuch.

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PENTSTEMON MENZIESII, *Benth.; Pl. Hartw., p.* 327. On rocks, Cascade mountains, O. T.

PENTSTEMON PROCERUS, *Dougl.; Hook. Flor. Bor. Am.* 2, *p.* 96. McCumber's, N. Cal., and Klamath basin.

PENTSTEMON HETEROPHYLLUS, *Lind. Bot. Reg. t.* 1899. Sides of Lassen's butte, N. Cal., July.

PENTSTEMON GLAUCIFOLIUS (sp. nov.): glaberrimus, glaucus; caule confertim folioso basi ramoso (1–2 pedali;) foliis crassiusculis integerrimis acutatissimis lanceolatis oblongisve in petiolem brevem attenuatis, cæteris semi-amplexicaulibus plerumque cordato-ovatis vel e basi sub-cordata ovato-lanceolatis; panicula virgata multiflora; pedunculis folia floralia superantibus folioso-bibracteatis 1–3-floris; calycis segmentis ovatis subacuminatis; corolla azurea sesquipolicari sursum ampliata; filamento sterili apice dilatato hirtello.

Fort Reading, on the Sacramento river, California. Cauline leaves 1–1½ inches long, about ½ inch wide at the clasping base, tapering to the acute apex; the floral similar, gradually decreasing in size; bractlets also foliaceous. Anthers hispid-ciliate, also hirsute at the insertion. Calyx nearly as in the broader-sepalled form of *P. heterophyllus*. A most elegant and showy species, which I should have referred to Bentham's *P. azureus* from his character, except that the sterile filament is not glabrous, and in my specimen of Hartweg's, No. 1879, the leaves are all rather narrowly lanceolate: indeed I cannot distinguish that plant from *P. heterophyllus*. It is possible that Mr. Bentham had the two plants, and drew the characters of the foliage from our present plant, and of the sterile filament from the allied *P. heterophyllus*. If the sparing beard of the sterile filament cannot be relied upon, and the two run together, then the variable species well deserves the name of *heterophyllus*.

PENTSTEMON GRACILENTUS (sp. nov.): glaber; caule tenero subpedali adscendente; foliis integerrimis inferioribus oblongo-lanceolatis in petiolum longiusculum attenuatis, superioribus paucis augusto-linearibus sessilibus, floralibus lineari-setaceis; panicula laxa subsimplici; cymis pedunculatis 3–5-floris; calycibus pedicellisque æquelongis pubero-glandulosis, segmentis oblongo-lanceolatis breviter acuminatis; corolla tubuloso-infundibuliformi subbilabiata cœrulea staminibusque glaberrimis; filamento sterili filiformi superne obsoletissimi barbato.

At the base of Lassen's butte, N. California. Lower leaves about two inches long, and with a petiole about one inch long; the upper few, and gradually reduced to slender bracts; corolla slender, half an inch long; anthers intermediate in structure between those of the sections Eupentstemon and Saccanthera, glabrous, except a minute denticulate ciliation at the line of dehiscence.

PENTSTEMON NEWBERRYI (sp. nov.): fruticosus, glaber, cæspitoso-procumbens; foliis ovalibus seu ovato-oblongis sub-coriaceis crebre serrulatis, caulinis obtusis basi in petiolum contractis summis sessilibus acutis; racemo 7–11-floro; calycis segmentis lanceolatis sensim acuminatis pedicellum æquantibus; corolla punicea tubulosa belabiata, labio, inferiore patente trifido intus lineis 2 barbato; staminibus sub-exsertis; antheris (praesertim ad margines) lanatis; filamento sterili brevi filiformi longitudinaliter parce barbato. (Plate XIV.) On rocks, forming broad tufts near Mount St. Joseph's, N. California. A well marked species of the section Elmigera, but with woolly anthers. Leaves turning blackish in drying. Corolla deep crimson, very handsome, 1¼ inches long.

Plate XIV. PENTSTEMON NEWBERRYI. A flowering stem of the natural size. Fig. 1. Corolla laid open, with the stamens. 2. A separate stamen. 3. Pistil and calyx, the ovary vertically divided. The analyses enlarged.

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CHELONE NEMOROSA, *Dougl.; Hook. Flor. Bor.-Am.* 2, *p.* 95. On rocks, Cascade mountains, latitute 44°.30′; altitude 6,500 feet.

VERONICA AMERICANA, *Schwein. in DC. Prodr.* Canoe creek, N. California.

VERONICA PEREGRINA, *Linn.; Hook. Flor. Bor.-Am.* 2, *p.* 101. N. California.

SCROPHULARIA NODOSA, *Michx.; Hook. Bor.-Am.* 2, *p.* 94. Throughout California and Oregon.

MIMULUS MOSCHATUS, *Dougl. Bot. Reg. t.* 1118. McCumber's, N. California.

MIMULUS LEWISII, *Pursh.; Hook. Flor. Bor.-Am.* 2, *p.* 100. Crater pass, Cascade mountains; altitude 6,700 feet. Corolla crimson.

MIMULUS SCOULERI, *Hook. Flor. Bor.-Am.* 2, *p.* 100. Very common in N. California.

MIMULUS CARDINALIS, *Dougl.; Benth. DC. Prodr.* 10, *p.* 370. Fort Reading, California.

MIMULUS PRIMULOIDES, *Benth.; Hook. Flor. Bor.-Am.* 2, *p.* 100. Shores of Klamath lake, Oregon Territory.

COLLINSIA BARTSIÆFOLIA, *Benth. in DC. Prodr.* 10, *p.* 318. Fort Reading, N. California.

LINARIA CANADENSIS, *Spreng.; Hook. Flor. Bor.-Am.* 2, *p.* 94. Petaluma, California.

EUNANUS FREMONTI, *Benth.; DC. Prodr.* 10, *p.* 374. McCumber's, N. California; July 29.

EUNANUS DOUGLASII, *Benth.; DC. Prodr.* 10, *p.* 374. Fort Reading, California.

CORDYLANTHUS RACEMOSUS, *Nutt.* McCumber's, N. California.

CORDYLANTHUS FILIFOLIUS, *Nutt.* Sacramento valley, California.

ORTHOCARPUS CASTILLEJOIDES, *Benth. in DC. Prodr.* 10 *p.* 536. McCumber's, N. California.

ORTHOCARPUS PURPURASCENS, *Benth. in DC. Prodr.* 10, *p.* 536. Fort Reading, California.

ORTHOCARPUS ERIANTHUS, *Benth. in DC. Prodr.* Petaluma, California.

PEDICULARIS ATTENUATUS, *Benth. in Hook. Flor. Bor.-Am.* 2, *p.* 110. Petaluma, California.

PEDICULARIS RACEMOSUS, *Dougl.; Hook. Flor. Bor.-Am.* 2, *p.* 108. Passes of Cascade mountains, O. T.; latitude, 44°; altitude, 6,800 feet. Var. β., whole plant very delicate.

CASTILLEJA PALLIDA, *Benth.; Hook. Flor. Bor.-Am.* 2, *p.* 105. McCumber's, N. Cal.; July 29.

CASTILLEJA MINIATA, *Benth.; Hook. Flor. Bor.-Am.* 2, *p.* 106. Crater pass, Cascade mountains.

CASTILLEJA AFFINIS, *Hook. & Arn. Bot. Beech. p.* 154. Banks of Canoe creek, Cal.; July 30.

CASTILLEJA DOUGLASII, *Benth. l. c.* McCumber's, N. Cal.

CASTILLEJA HISPIDA, *Benth. in Hook. Flor. Bor. Am.* 2, *p.* 105. Fort Reading, Cal.

VERBENACEÆ.

VERBENA HASTATA, *Linn.* Common throughout northern California.

VERBENA BRACTEOSA, *Michx.; Hook. Flor. Bor.-Am.* 2, *p.* 14; *DC. Prod.* 11, *p.* 549. Fort Dalles, O. T.

LABIATEÆ.

MONARDELLA CANDICANS, *Benth. Pl. Hartweg, No.* 1911. Sacramento valley, Coast Range, and McCumber's, N. Cal.

MONARDELLA SHELTONI, *Torrey.* McCumber's, N. California.

TRICHOSTEMA OBLONGUM, *Benth., ined. Hook. Flor. Bor.-Am.* 2, *p.* 117. Upper Pit river, Cal. Plant very fragrant.

STACHYS PALUSTRIS, *Linn.; Hook. Flor. Bor.-Am.* 2, *p.* 116. McCumber's, N. Cal.

STACHYS CILIATA, *Dougl.; Hook. Flor. Bor.-Am.* 2, *p.* 116. Cascade mountains, O. T.

SCUTELLARIA ANTIRRHINOIDES, *Benth.; DC. Prod.* Shores of Klamath lake, O. T.

SCUTELLARIA GALERICULATA, *Linn.* Shores of Klamath lake, O. T.

SCUTELLARIA TUBEROSA, *Benth. Lab. p.* 313. Shores of San Pablo bay, California.

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MICROMERIA DOUGLASII, *Benth. in DC. Prod.* 12, *p.* 223. Cascade mountains, O. T.

MENTHA CANADENSIS, *Linn.* McCumber's, N. Cal.

PRUNELLA VULGARIS, *Linn.* Common from San Francisco to the Columbia river.

PLANTAGINACEÆ.

PLANTAGO MAJOR, *Linn.* Fort Vancouver, W. T. (Introduced.)

PLANTAGO PATAGONICA, *Jacq.;* var. GNAPHALIOIDES, *Gray.* P. Gnaphalioides, *Nutt. Gen.* 1, *p.* 100. Whole plant very woolly. Dalles of the Columbia, O. T.

PRIMULACEÆ.

DODECATHEON MEADIA, *Linn.*, var. D. FRIGIDUM, *Cham.; Hook. Flor. Bor.-Amer.* 2, *p.* 118. Sacramento valley; Fort Reading, Cal.; Cascade mountains, O. T.

TRIENTALIS LATIFOLIA, *Hook. Flor. Bor.-Am.* 2, *p.* 121. Cascade mountains, O. T.

ANAGALLIS ARVENSIS, *Linn.* San Francisco, Cal. (Introduced.)

LENTIBULACEÆ.

UTRICULARIA VULGARIS, *Linn.* Klamath lake, O. T.

OROBANCHACEÆ.

PHELIPÆA COMOSA, *Gray, ined.* OROBANCHE COMOSA, *Hook. Fl, Bor.-Am.* 2, *t.* 169. Banks of Canoe creek.

APHYLLON UNIFLORUM, *Torr. Gray; Gray, Bot. North. U. S., p.* 290. Near San Francisco, California.

BORAGINACEÆ.—(By JOHN TORREY.)

ERITRICHIUM SCOULERI, *Alph. DC. Prodr.* 10, *p.* 130. In fine fruit. McCumber's and Klamath lake.

ERITRICHIUM FULVUM, *Alph. DC. l. c.* Fort Reading, Oregon, April. In flower.

PLAGIOBOTHRYS CANESCENS, *Benth. Pl. Hartw. p.* 324.? Differs from Hartweg's plant, in the corolla being twice as long as the calyx. Fort Reading.

ERITRICHIUM CALIFORNICUM, *Alph. DC. l. c.* No locality recorded.

CYNOGLOSSUM GRANDE, *Dougl.; Hook, Fl. Bor.-Am.* 2, *p.* 85. McCumber's and Fort Reading.

AMSINCKIA SPECTABILIS, *Fisch. & Mey. Index Hort. Petrop.* 1835; *DC. Prodr.* 10, *p.* 118. Fort Reading, California.

AMSINCKIA, *sp.* Sonoma, California.

HYDROPHYLLACEÆ.—(By A. GRAY.)

NEMOPHILA INSIGNIS, *Lindl.; A. DC. Prod.* 9, *p.* 270. Fort Reading, California.

NEMOPHILA PARVIFLORA, *Dougl.; A. DC. Prod.* 9, *p.* 290. Petaluma and Sonoma, California.

NEMOPHILA ATOMARIA, *Fisch. & Meyer; A. DC. Prod.* 9, 290. San Francisco, California.

PHACELIA CIRCINATA, *Jacq.; A. DC. Prod.* 9, *p.* 298. Northern California, passim; shores of Klamath lake.

EUTOCA PHACELIOIDES, *Benth. in Linn. Trans.* 17, *p.* 276. Shores of Klamath lake.

EMMENANTHE (MILTITZIA) PARVIFLORA (sp. nov.): nana, depresso-ramosissima; foliis pinnati-subpartitis, lobis 5–9 integerrimis; floribus congestis brevissime pedicellatis; corolla flava calycem haud superante; stylo brevi; seminibus plurimis reticulatis.—Along the shores of the

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Klamath lake. Root, without doubt, annual. Stems spreading nearly flat upon the ground, much branched, and, like the foliage, &c., minutely hairy and glandular. Leaves petioled, not dilated at the base; their lobes oblong or obovate, one or two lines long, the upper ones more confluent. Flowers crowded in somewhat scorpioid clusters, bractless. Pedicels much shorter than the calyx; bractlets none. Calyx in flower only about one and a half or two lines long, in fruit becoming three lines long; the sepals linear, obtuse, hairy and viscid. Corolla yellow, about the length of the calyx in anthesis, not increasing, but persistent, in fruit investing the lower two-thirds of the ripe capsule; rather narrow campanulate, 5-lobed, the short ovate lobes apparently quincuncially imbricated in æstivation, more or less hairy on the outside, within destitute of plicæ or appendages, except a very narrow and thin ring at the very base girting the base of the ovary, which rises into five slight and free lobes alternate with the stamens. Stamens inserted on the very base of the corolla, rather shorter than it: filaments a little dilated downwards: anthers short, didymous, incumbent; pollen globose. Ovary ovoid, densely hairy, truly 2-celled by the union of the placentæ in the axis; style not longer than the ovary, nearly glabrous, 2-cleft at the summit, nearly persistent: stigmas capitellate, rather large. Ovules numerous, 32—40 in each cell, namely, 16 to 20 in two rows on each half of each placentæ, amphitropous descending, more or less imbricated. Capsule three lines or a little more in length, loculicidal, ovoid, flattish parallel with the valves, incompletely 2-celled; the placentæ in contact but not coherent at maturity; adnate to the middle of the valves for the whole length, each maturing from 10 to 20 pendulous seeds. These are oblong, somewhat angled, the thin testa delicately reticulated. Embryo slender, about the length of the albumen.

As to the affinities of this plant, I cannot doubt that it is a close congener of Hooker and Arnott's *Eutoca? lutea*, although I possess no specimens of that plant. Judging from the published description and figure, this appears to differ from our plant chiefly in the slightly, if at all, lobed leaves, the larger flowers, and more conspicuous corolla longer than the calyx, the much longer style, and the fewer, only 8,(?) ovules. The seeds, moreover, are represented with spiral markings, something like those of Microgenites, as figured in Gay's Flora Chilena. The inconspicuous disk, adnate to the corolla in our plant, is not noticed in the other, but it might readily be overlooked. Upon this plant Alphonse De Candolle founded his genus Miltitzia; and the present question is, whether that genus, now strengthened by a second species, is to be adopted, or whether it should be merged in Bentham's genus Emmenanthe? It will be seen that I incline to the latter view; but should retain Miltitzia as a subgenus, distinguished by considerable difference in habit, by the ovoid (instead of the oblong) ovary, and by the 10-toothed small disk being adnate to the very base of the corolla, instead of free from it. I perceive no other characters. The yellow or sulphur-colored and marcescent corolla marks the genus.

Plate XV. EMMENANTHE (MILTITZIA) PARVIFLORA. Part of the plant of the natural size. Fig. 1. A flower. 2. Corolla laid open, with the stamens. 3. Pistil, the ovary transversely divided. 4. A pistil, with the ovary vertically divided. 5. Portion of a placenta, with ovules. 6. A mature capsule, with the persistent calyx and corolla. 7. Transverse section of a capsule. 8. A valve of the capsule, with placenta and seed, seen obliquely. 9. A seed. 10. The same vertically divided, showing the embryo.

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POLEMONIACEÆ.

GILIA CAPITATA, *Dougl.; Benth. in DC. Prod.* 9, *p.* 315. Fort Reading, N. California; April, in flower.

GILIA TRICOLOR, *Benth. in DC. Prod.* 9, *p.* 312. Fort Reading, North California; April, in flower.

GILIA PULCHELLA, (*Dougl.*) *Hook. Flor. Bor.-Amer.* 2, *p.* 74. IPOMOPSIS ELEGANS, *Lindl. Bot. Reg. t.* 1281. Pine woods, N. California and Oregon; July, August.

GILIA PHARNECIOIDES, *Benth. Pl. Hartw. p.* 325. Fort Reading, N. California; April.

GILIA MICRANTHA, *Steud.; Benth. Pl. Hartweg. p.* 324. McCumber's, N. California; July, in flower.

GILIA DICHOTOMA, *Benth.; DC. Prod.* 9, *p.* 314. Fort Reading, California; April, in flower.

GILIA CONGESTA, *Hook. Flor. Bor.-Amer.* 2, *p.* 75. Hat creek, N. California; July, in flower.

GILIA INCONSPICUA, *Dougl. in Bot. Mag. t.* 2883; *DC. Prod.* 9, *p.* 312. San Francisco, California; April, in flower.

COLLOMIA GRANDIFLORA, *Dougl. in Bot. Reg.* 14, *t.* 1174. McCumber's, N. California, and shores of Klamath lake.

COLLOMIA GRACILIS, *Dougl.; Benth. in DC. Prod.* 9, *p.* 308, *& Plant. Hartweg. p.* 323. Sacramento valley, California.

POLEMONIUM REPTANS, *Linn.; Hook. Bot. Mag. t.* 1887. Crater pass, Cascade mountains, O. T.

POLEMONIUM CŒRULEUM, *Linn.; Hook. Flor. Bor.-Amer.* 2, *p.* 71. Shores of Klamath lake. O. T.; August.

PHLOX DIFFUSA, *Benth. Plant. Hartweg. p.* 325. In dry rocky places. Canoe creek, N. California; July.

LEPTODACTYLON PUNGENS? *Torr.; DC. Prod.* 9, *p.* 316. Flowers pink and white. Shores of Rhett lake; August.

LEPTODACTYLON HOOKERI, *Benth.; DC. Prod.* 9, *p.* 316. Near San Francisco, California.

CONVOLVULACEÆ.

CONVOLVULUS CALIFORNICUS, *Chois. in DC. Prod.* 9, *p.* 405. Corolla yellowish-white. Hat creek, N. California; July.

CUSCUTA CALIFORNICA, *Hook. & Arn.; Chois. in DC. Prod.* 9, *p.* 457. Sacramento valley; July, in flower.

SOLANACEÆ.

SOLANUM NIGRUM, *Linn.* var. PUBESCENS, *Hook. & Arn. Bot. Beech. p.* 152. Common throughout N. California, and on the Columbia river, O. T.

SOLANUM UMBELLIFERUM, *Eschsch.; Hook. & Arn. Bot. Beech. p.* 375. Near San Francisco.

DATURA STRAMONIUM, *Linn.* San Francisco, California. (Introduced.)

GENTIANACEÆ.—(By ASA GRAY.)

GENTIANA AFFINIS, *Griseb. in Hook. Flor. Bor.-Am.* 2, *p.* 56. Shores of Klamath lake; August 22.

GENTIANA CALYCOSA? *Griseb. in Hook. Flor. Bor-Am.* 2, *p.* 58, *t.* 146. Crater pass, Cascade mountains; altitude 6,000 feet.

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GENTIANA ACUTA, *Michx*, var. STRICTA. Banks of Hat creek, California.

GENTIANA SIMPLEX (Sp. nov.:) caule unifloro e radice annua simplicissimo parce foliato gracili (semipedali et ultra;) foliis lineari-lanceolatis oblongis crassiusculis; calyce quadrifido, segmentis lanceolatis; corolla cœrulea infundibuliformi imberbi haud coronata, lobis 4 oblongo-spathulatis integerrimis; antheris brevibus discretis; stylo brevi; stigmatibus rotundato-dilatatis; capsula stipitata; seminibus alatis. Upper Klamath lake; August.

It is not easy to fix upon the section of the genus to which this pretty and well-marked species should be referred. The discoverer not unnaturally took the plant for a *Cicendia*, notwithstanding the size of the blossom; but the stout style is persistent on the capsule and splits through in dehiscence, and all the characters are those of a Gentian. The slender stems are always simple, and bear from two to four pairs of small leaves, the uppermost remote from the solitary flower. The showy corolla is fully an inch long, and of a bright blue color. The stigmas are large and broad; the ovary tapers below into a decided stipe, which in fruit is half the length of the oblong capsule; and the seeds are broadly winged; their insertion sutural.

Plate XVI. GENTIANA SIMPLEX. Three entire plants. Fig. 1. The calyx laid open, and the ovary transversely divided. 2. Upper part of the corolla laid open, with the stamens, and the upper part of the pistil. 3. A capsule, dehiscent, with its stipe. 4. Seeds. The details variously magnified.

ERYTHRAEA MUHLENBERGII, *Griseb. in DC. Prod.* 9, *p.* 60. This is the "*Canchalagua*" of the natives of California, for which high medicinal virtues are claimed. It grows plentifully on the low grounds bordering Suisun bay; the flowers are rose red, numerous, and very pretty.

MENYANTHES TRIFOLIATA, *Linn.* Common in marshes in the Sacramento valley.

APOCYNACEÆ.

APOCYNUM ANDROSÆMIFOLIUM, *Linn.* Banks of Pit river and McCumber's, California. Plant always smaller than in the Eastern States.

APOCYNUM CANNABINUM, *Linn.* Pit river, lower cañon; August 6.

ASCLEPIADACEÆ.—(By J. TORREY.)

ASCLEPIAS FRÉMONTI, *Torrey.* McCumber's, N. Cal.

ASCLEPIAS FASCICULARIS, var. foliis latioribus, *Decaisne in DC. Prod. p.* 569. Common in N. California and southern Oregon.

OLEACEÆ.

FRAXINUS OREGANA, *Nutt. Sylv.* 3, *p.* 59. Fort Reading, California.

ARISTOTOCHACEÆ.

ARISTOLOCHIA CALIFORNICA, *Torr. in Whippl. Rep. p.* 178. Banks of Sacramento near Fort Reading, California.

ASARUM HOOKERI, *Field. Sert. t.* 32. Cascade mountains, O. T.

CHENOPODIACEÆ.—(By JOHN TORREY.)

OBIONE ARGENTEA, *Moq. Chenop. p.* 76. Klamath lake.

BLITUM RUBRUM, *Reich.*; *Moq. in DC. Prodr.* 13, (*pars* 1,) *p.* 83. Klamath lake.

ATRIPLEX PATULA, *Linn.* Klamath.

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ARTHOCNEMUM FRUTICOSUM, var. CALIFORNICUM, *Moq. in DC. Prodr.* 13, *pars* 2, *p.* 151. Suisun bay, California.

POLYGONACEÆ.—(By JOHN TORREY.)

POLYGONUM AVICULARE, *Linn.* Dalles of the Columbia; probably introduced.

POLYGONUM AMPHIBIUM, *Linn.* var. TERRESTRE, *Torr. Fl. N. St. p.* 403. McCumber's; July 29.

POLYGONUM TENUE, *Michx. Fl.* 1, *p.* 238. Klamath lake.

POLYGONUM COARCTATUM, *Dougl. in Hook. Flor. Bor.-Amer.* 2, *p.* 133.

RUMEX MARITIMUS, *Linn.* Marshes, Klamath lake. The specimens are scarcely two inches high, and yet are loaded with mature fruit.

RUMEX DOMESTICUS, *Hartm.; Hook. Fl. Bor.-Am.* 2, *p.* 129. McCumber's; grows in water.

ERIOGONUM MICROTHECUM, *Nutt. Pl. Gamb. in Jour. Acad. Phil.* (*n. ser.*) 1, *p.* 162. Psuc-see-que creek, O. T.; September.

ERIOGONUM NIVEUM, *Dougl. in Benth. Eriog.* Fort Dalles, O. T.; October 5.

ERIOGONUM FLAVUM, var. CRASSIFOLIUM, *Benth. Mss.* E. crassifolium, *Benth. in Hook. Fl. Bor. Amer.* 2, *p.* 134, *t.* 176.

ERIOGONUM POLYANTHUM, *Benth. in DC. Prodr.* Fort Reading and Hat creek? This species was found also by Mr. Brackenridge and by Col. Frémont in California.

ERIOGONUM NUDUM, *Dougl. in Benth. Eriog.* McCumber's, N. California.

LAURACEÆ.

OREODAPHNE CALIFORNICA, *Nees.* Tetranthera? Californica, *Hook. & Arn. Bot. Beech. p.* 159. Laurus? regia, *Dougl. in Comp. Bot. Mag.* 2. Umbellularia Californica, *Nutt. Sylv.* 1, *p.* 87.

LORANTHACEÆ.

PHORADENDRON FLAVESCENS, var. PUBESCENS, *Engel. in Gray, Pl. Lindh.* 2, *p.* 212. Parasitic on *Æsculus Californica*, near Benicia; July.

ARCEUTHOBIUM OXYCEDRI, *Bieb.; Hook. Flor. Bor.-Amer.* 1, *p.* 278, *t.* 99. Common on *Pinus contorta* in northern California and Oregon.

CALLITRICHACEÆ.

CALLITRICHE VERNA, *Linn.* San Francisco, California; in water.

EUPHORBIACEÆ.

EREMOCARPUS SETIGERUS, *Benth. Bot. Sulph. p.* 53, *t.* 26. Croton setigerum, *Hook. Flor. Bor. Amer.* 2, *p.* 141. Gravelly banks of Sacramento river, Cal. The growing plant very fragrant.

EUPHORBIA MACULATA? *Linn.* Fort Dalles, O. T.; introduced?

NYCTAGINACEÆ.

ABRONIA MELLIFERA, *Dougl.; Chois. in DC. Prod.* 13, 2, *p.* 435. Flowers rose-colored, pretty. Shores of San Pablo bay, Cal.

ABRONIA ARENARIA, *Menz.; Chois. in DC. Prod.* 13, 2, *p.* 435. Flowers yellow, fragrant. Sandy beaches, near San Francisco, Cal.

CUPULIFERÆ.

QUERCUS AGRIFOLIA, *Nees, in Ann. Sci. Nat.* 3, *p.* 271. Common in Sacramento valley.

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QUERCUS GARRYANA, *Hook. Flor. Bor.-Amer.* 3, *p.* 159. Northern California and Oregon.

QUERCUS HINDSII, *Benth. Bot. Sulph. p.* 55. Sacramento valley, Cal.

QUERCUS KELLOGGII, *Newb.* Q. tinctoria var. Californica, *Torrey, in Whipple's Rep. p.* 138. Hills near San Francisco and Fort Reading.

QUERCUS DENSIFLORA, *Hook. & Arn. Bot. Beech. p.* 391. Q. Echinacea, *Torr. l. c.; Nutt. Sylv.* 1, *p.* 11, *t.* 5. Foot hills, Sierra Nevada, Cal.

QUERCUS FULVESCENS, *Kellogg, Proc. Cal. Acad.* 1, *p.* 67, 71. Q.crassipocula, *Torr. l. c.* Banks of Canoe creek.

QUERCUS (SP. ———.) We passed through thickets of a small oak, near Lassen's butte, N. Cal., which is apparently undescribed. Our specimens were unfortunately lost in crossing the Cascade mountains. The leaf and fruit resemble those of *Q. Garryana*, but the plant grows but 5 or 6 feet high.

CASTANEA CHRYSOPHYLLA, *Dougl. in Hook. Flor. Bor.-Amer.* 2, *p.* 159. N. California and Cascade mountains, O. T.

CORYLUS ROSTRATA, *Ait.* Common in Oregon Territory.

MYRICACEÆ.

MYRICA CALIFORNICA, *Cham. & Schlecht in Linnea, p.* 535. On the coast near San Francisco, California.

BETULACEÆ.

BETULA GLANDULOSA, *Michx.* Sphagnous marshes, Cascade mountains, O. T.; latitude 44°.

BETULA OCCIDENTALIS, *Hook. Flor. Bor.-Amer.* 2, *p.* 155; *Nutt. Sylv., p.* 22. Banks of Psuc-see-que creek, Des Chutes basin, O. T.

ALNUS OREGANA, *Nutt. Sylv.* 1, *p.* 28, *t.* On the Sacramento and Columbia rivers.

ALNUS VIRIDIS, *DC. Fl., Fr.* 3, *p.* 304. Cascade mountains, O. T.

SALICACEÆ.

POPULUS TREMULOIDES, *Michx. Flor. Amer.* 2, *p.* 243. Along streams, N. California and Oregon.

POPULUS ANGUSTIFOLIA, *Torr. Ann. Lyc. Nat. Hist.* 2, *p.* 249. Banks of Columbia river.

POPULUS MONILIFERA, *Ait.* Banks of Sacramento river, California.

SALIX HINDSIANA, *Benth. Pl. Hartw. No.* 1956. Banks of Sacramento river, California.

SALIX LASIANDRA, *Benth. Pl. Hartw. No.* 1954. Banks of Sacramento river, California.

SALIX PENTANDRA, *Nutt. Sylva*, 1, *p.* 61, *t.* 18. Banks of the Willamette river, O. T.

SALIX SPECIOSA, *Nutt. Sylv.* 1, *p.* 58, *t.* 17. Banks of Columbia river, O. T.

PLATANACEÆ.

PLATANUS RACEMOSA, *Nutt. Sylva*, 1, *p.* 47, *t.* 15. Sacramento valley, California.

URTICACEÆ.

URTICA GRACILIS, *Ait.* McCumber's Flat, N. California.

URTICA URENS, ? *Linn.* Banks of Canoe creek, N. California.

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CONIFERÆ.

PINUS LAMBERTIANA, *Dougl.; Lamb. Pinus, ed.* 2, *p.* 57, *t.* 34. Throughout northern California and Oregon.

PINUS SABINIANA, *Dougl.; Lamb. Pinus, ed.* 2*d*, 2, *p.* 146, *t.* 80. Foot hills of Coast mountains and Sierra Nevada, in California.

PINUS PONDEROSA, *Dougl.; Loud. Arboret.* 4, *p.* 2243. Throughout California and Oregon.

PINUS CONTORTA, *Dougl.; Loud. Encyc. Trees, fig.* 1814–1815. Common in the Sierra Nevada and Cascade mountains, in Oregon and California.

PINUS CEMBROIDES, *Zucc.; Jour. Lond. Hort. Soc.* 2, *p.* 246. On summits of Cascade mountains, O. T.

PINUS INSIGNIS, *Dougl.; Loud. Arboret.* 4, *p.* 2265. Near San Francisco and southward.

PICEA NOBILIS, *Dougl.; Loud. Arboret.* 4, *p.* 2343. Cascade mountains, O. T.

PICEA GRANDIS, *Dougl.; Loud. Arboret.* 4, *p.* 2341. Cascade mountains, O. T.

PICEA AMABILIS, *Dougl.; Loud. Arboret.* 4, *p.* 2342. Cascade mountains, O. T.

ABIES DOUGLASII, *Lindl. Penny Cyclop.* 1, *p.* 32. Throughout Oregon, and mountains of interior of California.

ABIES MENZIESII, *Dougl.*; *Loud. Arboret.* 4, *p.* 2321. Common in Oregon and mountains of California.

ABIES WILLIAMSONI, *Newb.* On summits of Cascade mountains, O. T.

SEQUOIA GIGANTEA, *Torr. in Sill. Jour.* 2*d ser.*, 18, *p.* 150. Foot hills of Sierra Nevada, Cal.

SEQUOIA SEMPERVIRENS, *Endl. Syn. Conif. p.* 198. Coast mountains of California.

LIBOCEDRUS DECURRENS, *Torr. in Smithson. Contrib.* 6, *p.* 7, *t.* 3. Common in mountains of northern California.

THUJA GIGANTEA, *Nutt. Sylva*, 3, *p.* 111. Throughout mountains of Oregon.

TAXUS BREVIFOLIA, *Nutt. Sylva*, 3, *p.* 86, *t.* 108. In Cascade mountains and Sierra Nevada.

JUNIPERUS OCCIDENTALIS, *Hook. Flor. Bor.-Amer.* 2, *p.* 166. Great Basin east of Cascade mountains, and Sierra Nevada.

JUNIPERUS COMMUNIS, *Linn.* Summits of Cascade mountains, O. T.

CUPRESSUS NUTKATENSIS, *Hook. Flor. Bor.-Amer.* 2, *p.* 165. Summits of Cascade mountains, O. T.

TORREYA CALIFORNICA, *Torr. in N. Y. Jour. Pharm.* 3, *p.* 49. In Coast mountains, Cal.

LARIX OCCIDENTALIS, *Nutt. Sylva,* 3, *p.* 143, *t.* 120. Cascade mountains, O. T.

II. ENDOGENOUS PLANTS.

BY JOHN TORREY.

ARACEÆ.

SYMPLOCARPUS KAMTSCHATICUS, *Bong.; Hook. Flor. Bor.-Am.* 2, *p.* 169. Peat bogs, Cascade mountains, O. T.; lat. 44°.

TYPHACEÆ.

TYPHA LATIFOLIA, *Linn.* Common from Sacramento valley to Columbia.

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